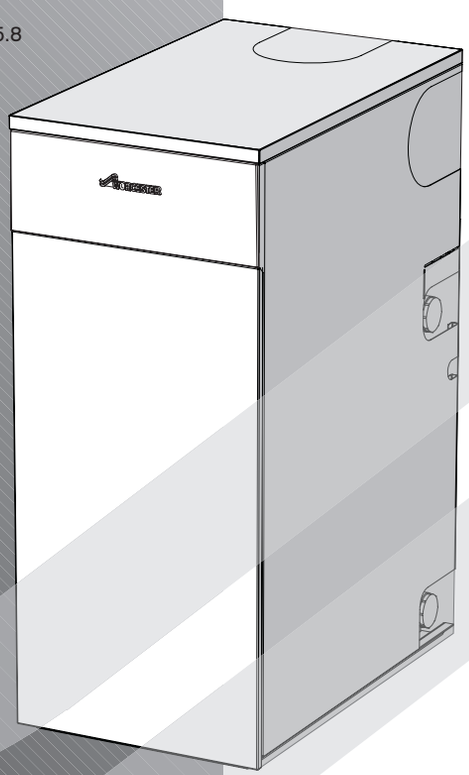
GREENSTAR UTILITY 18/25kW

FLOOR STANDING OIL-FIRED CONDENSING BOILER CONVENTIONAL FLUE & ROOM SEALED FLUE

FOR FULLY PUMPED OPEN VENT OR SEALED CENTRAL HEATING SYSTEMS AND DOMESTIC HOT WATER CYLINDERS

Patent pending:
Application number 0327645.8



THE APPLIANCE IS FOR USE WITH 28 SECOND KEROSENE ONLY

GB

INSTRUCTION MANUAL
INSTALLATION COMMISSIONING & SERVICING

WORCESTER
Bosch Group

8-716-106-256a (08.05)

WORCESTER BOSCH:

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SENTINEL 0151 420 9595
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FLUE TERMINAL GUARDS:

WORCESTER BOSCH
Part Number: 7-716-190-050

CONVENTIONAL FLUE MANUFACTURERS:

INTERACTIVE (Flue Systems) Ltd., 01908 569887
Selkirk Manufacturing Ltd. (SF Ltd.), 01271 326633

CONDENSATE PUMP MANUFACTURERS:

ASPEN 01323 848842

OIL FIRING TECHNICAL ASSOCIATION:

OFTEC 0845 6585080
www.oftec.org

IMPORTANT HANDLING INSTRUCTIONS:

It is advised that more than one person is involved in the transfer of the packaged appliance from the van to the point of installation.

It is advised that no attempt should be made to move the packaged appliance without the use of a suitable truck.

At all times the correct method for handling heavy objects should be strictly observed.

GENERAL HANDLING GUIDELINES:

- Lift only a manageable weight, or ask for help.
- When lifting, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry items close to the body
- Wear protective clothing and gloves to protect from any sharp edges.

Store the appliance in a dry area prior to installation.

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE STARTING INSTALLATION.

THESE INSTRUCTIONS ARE APPLICABLE TO THE WORCESTER BOSCH APPLIANCE MODEL(S) STATED ON THE FRONT COVER OF THIS MANUAL ONLY AND MUST NOT BE USED WITH ANY OTHER MAKE OR MODEL OF APPLIANCE.

THE INSTRUCTIONS APPLY IN THE UK ONLY AND MUST BE FOLLOWED EXCEPT FOR ANY STATUTORY OBLIGATION.

THIS APPLIANCE MUST BE INSTALLED BY A COMPETENT PERSON. FAILURE TO INSTALL CORRECTLY COULD LEAD TO PROSECUTION.

IF YOU ARE IN ANY DOUBT CONTACT WORCESTER BOSCH TECHNICAL HELPLINE.

DISTANCE LEARNING AND TRAINING COURSES ARE AVAILABLE FROM WORCESTER BOSCH.

PLEASE LEAVE THESE INSTRUCTIONS WITH THE USER OR WITH THE APPLIANCE AFTER INSTALLATION OR SERVICING.

ABBREVIATIONS USED IN THIS MANUAL:

Ø	Diameter
CH	Central Heating
DHW	Domestic Hot Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
CF	Conventional flue
RS	Room sealed flue
N/A	Not allowed
SEDBUK	Seasonal Efficiency for Domestic Boilers in the United Kingdom
OFTEC	Oil Firing Technical Association for the Petroleum Industry

SYMBOLS USED:

Central heating

Electricity supply

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N/A	

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SAFETY PRECAUTIONS

OIL SMELLS, LEAKS OR FUMES FROM THE APPLIANCE:

- Extinguish any naked flames
- Open windows and doors
- Isolate the electrical supply
- Isolate the fuel supply to the boiler
- Rectify fault.

HEALTH & SAFETY:

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988). Where applicable, the CE mark indicates compliance with relative EU Directives.

COMBUSTIBLE AND CORROSIVE MATERIALS:

Do **not** store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

The combustion air must be kept clear of chemically aggressive substances which can corrode the appliance and invalidate any warranty.

FITTING & MODIFICATIONS:

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with these instructions and the relevant Installation Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions.

Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING:

Advise the user to have the system regularly serviced by a competent, qualified engineer (such as OFTEC registered personnel) using approved spares, to help maintain the economy, safety and reliability of the appliance.

INSTALLATION REGULATIONS

Failure to install appliances correctly could lead to prosecution.

The appliance should be installed by a competent person. The person installing the appliance should be aware of the Health and Safety at Work Act and take appropriate action to ensure that the regulations are adhered to. In order to give optimum efficiency and trouble free operation the appliance must be commissioned by a qualified OFTEC engineer.

The compliance with a British Standard does not, of itself, confer immunity from legal obligations. In particular the installation of this appliance must be in accordance with the relevant requirements of the following British Standards and regulations in respect of the safe installation of equipment.

BS 5410: part 1: Code of practice for Oil Fired Boilers.

BS 799: part 5: Specification for Oil Storage Tanks.

BS 7593: Code of Practice for treatment of water in domestic hot water central heating systems.

BS 5449: part 1: Specification for forced circulation hot water central heating for domestic premises.

BS 5955: part 8: Specification for the installation of thermoplastic pipes and associated fittings for use in domestic hot and cold water services and heating systems.

BS 7291: Thermoplastic pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings.

BS 7074: part 1: Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems.

BS 7671: IEE Wiring Regulations, current edition.

The Building Regulations Part J and L1 England and Wales; Part F and Part J Section III Scotland; Part L and Part F Northern Ireland.

Local water company bye-laws.

The Control of Pollution (Oil) Regulations.

OFTEC Standards.

Where no specific instruction is given reference should be made to the relevant codes of practice.

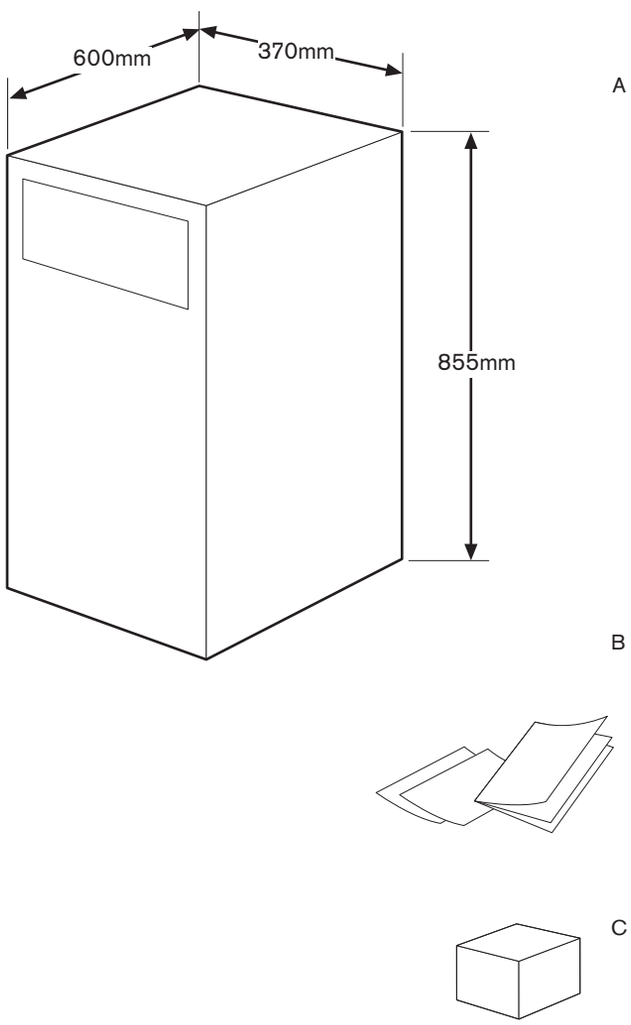
STANDARD PACKAGE:

A - Floor standing oil fired condensing boiler.

B - Literature pack.

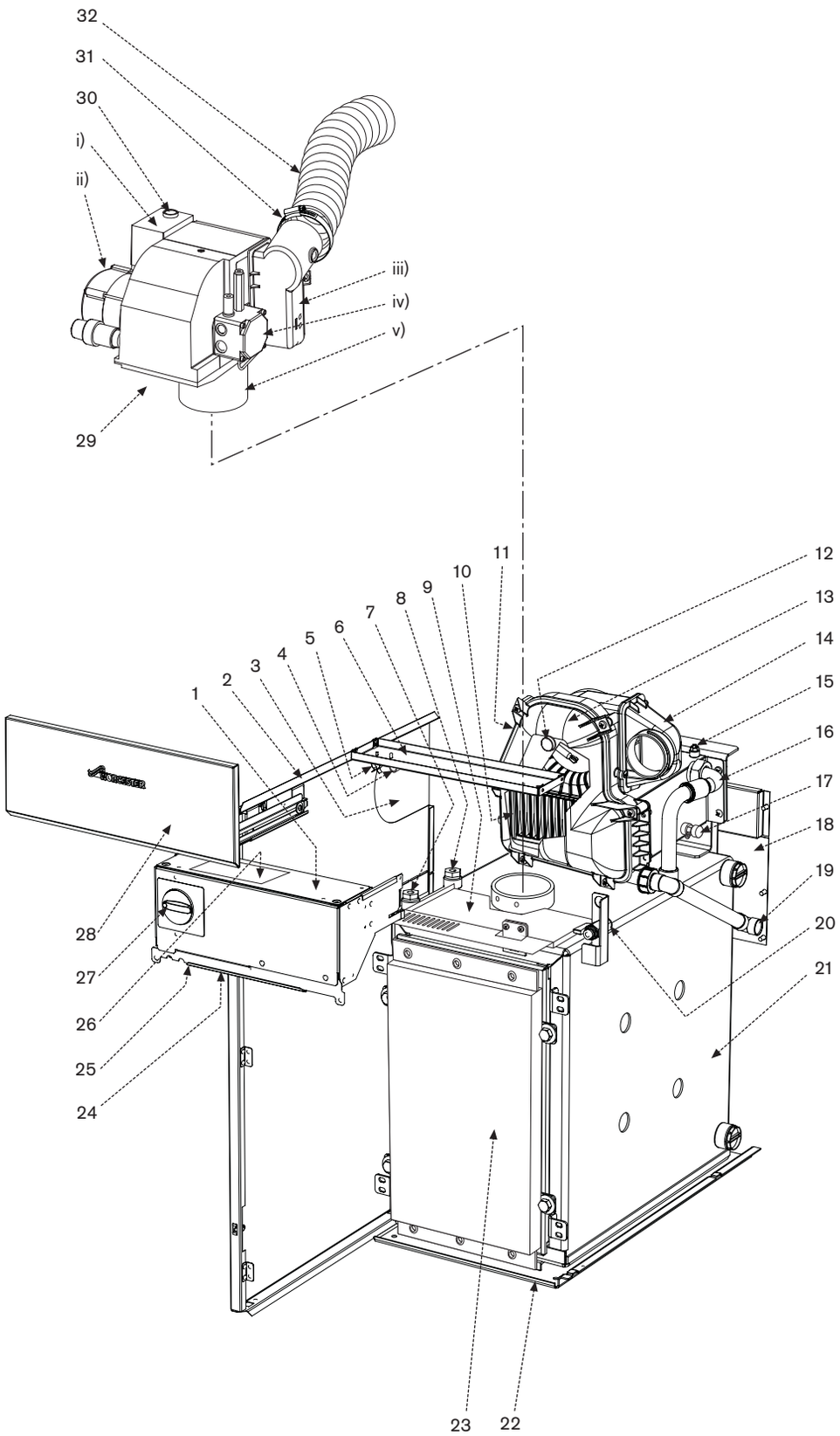
C - Hardware pack including:

Condensate trap.



DESCRIPTION	UNITS	18/25kW
Central Heating		
Primary water capacity (total)	litres	24.5
Maximum static head	metres	30
Minimum static head	metres	1
Water side resistance (20°C difference)	mbar	57
Max. permissible sealed system operating pressure	bar	2.65
Flue		
Exit flue gas mass flow	kg/hr	40
Pipework connections		
Fuel line (compression)	mm	10
CH flow	inch BSP	1
CH return	mm	22
CH vent (Optional)	inch BSP	1
CH drain	inch BSP	1
Condensate (polypropylene)	mm	21.5
Electrical		
Electrical power supply voltage	AC...V	230
Frequency	Hz	50
Max. power consumption	W	155
Thermostats		
Boiler flow temperature range (cut in/cut out)	°C	55/81
CH control thermostat differential	°C	5
Boiler high limit thermostat set point	°C	95
Boiler manual reset overheat thermostat set point	°C	105
Flue reset overheat thermostat set point	°C	110
General Data		
Maximum hearth temperature	°C	<100
SEDBUK (Band A)	%	92.9
Appliance protection rating	IP	20
Weight (excluding packaging)	kg	120

LAYOUT & COMPONENTS



The diagram opposite excludes the top,front and RH side casing panels.

1 CONTROL BOX ASSEMBLY
2 CASING SIDE PANEL
3 FLUE 'KNOCK-OUT' PANEL
4 CLIP - POWER CABLE
5 CLIP - FIRE SENSOR
6 CASING SUPPORT PANEL
7 CONTROL & MANUAL RESET HIGH LIMIT THERMOSTATS
8 OVERHEAT THERMOSTAT (AUTOMATIC RESET)
9 TRAY
10 SECONDARY HEAT EXCHANGER
11 MANUAL RESET FLUE OVERHEAT THERMOSTAT
12 FLUE GAS SAMPLING POINT
13 FLUE MANIFOLD ACCESS COVER
14 AIR INLET CASING
15 MANUAL AIR VENT - SECONDARY HEAT EXCHANGER
16 HEAT EXCHANGER FLOW PIPE
17 DRAIN - SECONDARY HEAT EXCHANGER
18 REAR CABINET SUPPORT BRACKET
19 CONDENSATE OUTLET
20 FUEL ISOLATING VALVE
21 PRIMARY HEAT EXCHANGER
22 BASE PLATE
23 COMBUSTION CHAMBER ACCESS DOOR
24 OVERHEAT RESET BUTTON
25 FLUE OVERHEAT RESET BUTTON
26 DATA LABEL
27 TEMPERATURE CONTROL
28 TOP FRONT PANEL
29 STERLING 50 BURNER
   i) Control box
   ii) Motor
   iii) Air intake casing
   iv) Oil pump
   v) Combustion head
30 LOCK-OUT INDICATOR/RESET BUTTON
31 CLIP - AIR INTAKE HOSE
32 AIR INTAKE HOSE

IMPORTANT: All the following pre-installation sections must be read and requirements met before starting boiler or flue installation.

CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

IMPORTANT:

Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

BEFORE CLEANING THE SYSTEM:

ENSURE THE SYSTEM AND PIPEWORK IS IN GOOD WORKING ORDER.

USE THE EXISTING BOILER/CIRCULATING PUMP WHERE POSSIBLE OR USE A POWER FLUSHING MACHINE TO AID THE CLEANSING PROCEDURE BEFORE INSTALLING A NEW BOILER.

CLEANING THE PRIMARY SYSTEM:

- Fill the system with cold mains water to the recommended pressure and check for leaks.
- Open all drain cocks and drain the system.
- Close drain cocks and add a suitable flushing agent at the correct strength for the system condition in accordance with the manufacturer's instructions.
- Circulate the flushing agent before the boiler is fired up.
- Run the boiler and system at normal operating temperature in accordance with the manufacturer's instructions.
- Drain and thoroughly flush the system to remove the flushing agent and any debris.

ELECTRIC SUPPLY:

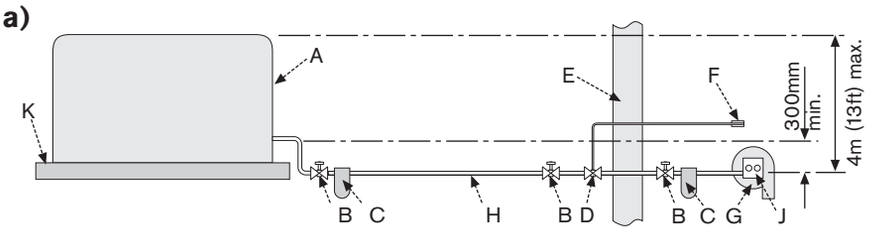
- Supply: 230V - 50Hz.
- Cable: PVC insulated 0.75mm² (24 x 0.2mm) temperature rated to 90°C.
- Protection IP20.
- External 5A fuse to BS1362.
- The appliance must be earthed.
- All pipes to the boiler must be cross-bonded.
- It must be possible to isolate the appliance from the electric supply with at least a 3mm contact separation in all poles supplying the appliance.
- Wiring between the appliance and the electrical supply must comply with IEE wiring regulations and any local regulations which may apply for fixed wiring to a stationary appliance.
- Any system connected to the boiler must not have a separate electricity supply.

A - Oil storage tank
B - Isolating valve
C - Oil filter
D - Fire valve to BS5410
E - External wall
F - Fire valve sensor
G - Oil burner
H - Oil supply pipe
J - Oil pump
K - Full base (plastic tanks)
L - Non-return valve
M - De-aerator

Note: All dimensions are in metres unless stated otherwise.

The maximum pipe run figures are based on using copper pipe with an inside diameter of 2mm less than the Ø.

a)

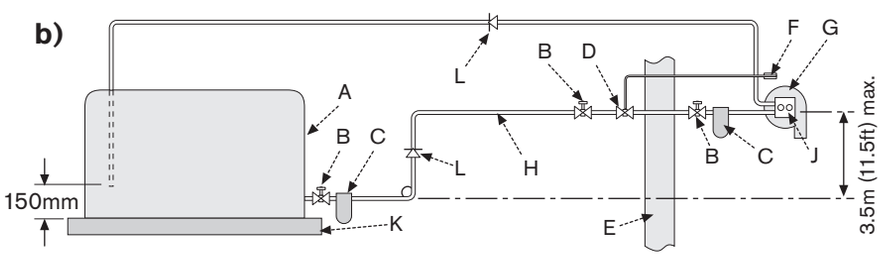


MAXIMUM PIPE RUN FOR SINGLE PIPE GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ
0.5	12	30
1.0	25	69
1.5	37	91
2.0	49	100

HEAD	10mmØ	12mmØ
2.5	62	100
3.0	74	100
3.5	87	100
4.0	99	100

b)

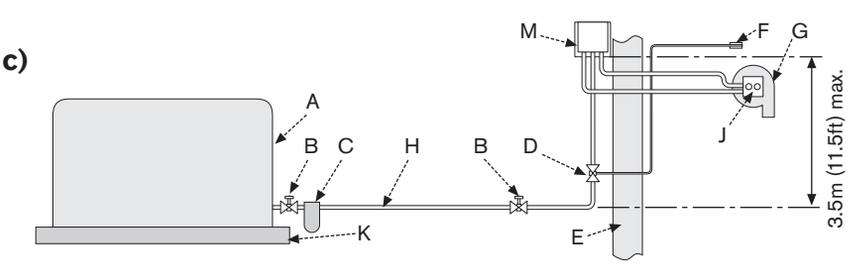


MAXIMUM PIPE RUN FOR DOUBLE PIPE SUB-GRAVITY FEED SYSTEM

HEAD	10mmØ	12mmØ
0	50	100
0.5	44	100
1.0	38	95
1.5	32	80

HEAD	10mmØ	12mmØ
2.0	26	66
2.5	20	50
3.0	14	37
3.5	8	22

c)



MAXIMUM PIPE RUN FOR SINGLE PIPE SUCTION LIFT WITH DE-AERATOR

HEAD	FUEL FLOW RATE 2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ
0	100	55	26	100
0.5	95	45	23	100
1.0	80	40	20	90
1.5	70	35	17	75

HEAD	FUEL FLOW RATE 2.5kg/h 8mmØ	5kg/h 8mmØ	10kg/h 8mmØ	10kg/h 10mmØ
2.0	60	30	14	65
2.5	45	25	11	50
3.0	35	15	8	35
3.5	25	10	5	20

The table and illustration above is a guide only and does not in any way override the de-aerators manufacturers instructions.

MAINS SUPPLIES

OIL SUPPLY:

- Plastic or steel tanks should be installed to BS5410. A steel tank should conform to BS799: part 5 and have a slope of 1 in 24 away from the outlet valve with a sludge cock at its lower end.
- **Do not use galvanised steel tanks or pipework for the oil supply system.**
- **Do not use soldered joints on the oil supply pipework as this could cause a hazard in the event of a fire.**

a) Single pipe gravity feed system:

The oil storage tank (A) must be positioned so that the oil level does not exceed 4 metres above the level of the burner oil pump (J) and in addition the oil level must be at least 300mm above the oil pump (J). Where the maximum oil level in the oil storage tank exceeds 4 metres, a head breaking device must be installed between the tank (A) and the burner oil pump (J).

b) Double pipe sub-gravity feed system:

Maximum suction height 3.5 metres. Non-return valves must be fitted to the inlet and return oil line between the oil pump (J) and oil storage tank (A).

c) Single pipe suction lift with de-aerator

Maximum suction height 3.5 metres. The oil tank (A) must be positioned below the oil pump (J). Create an inlet and return loop between the de-aerator (M) and oil pump (J).

A non-return valve must be incorporated within the de-aerator or fitted to the oil line between the oil storage tank (A) and the de-aerator (M).

A top feed oil tank fitted with a de-aerator using an internal non-return valve should have any non-return valve/s fitted in the base of the tank to the suction line removed to assist purging air from the oil line.

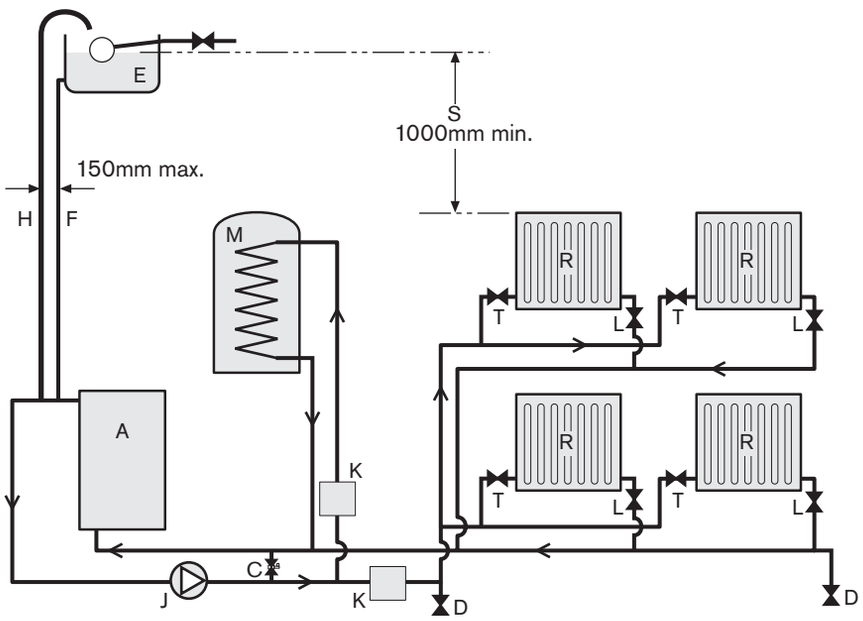
Pipework

- Use copper pipe of the correct diameter according to the information shown opposite. Use flexible hoses to connect to the oil pump (J).
- Lay the oil supply pipe (H) as straight and level as possible to avoid air pockets and unnecessary friction losses. Route away from the boiler access door or other hot surfaces.
- Install a manual isolating valve (B) to the oil supply pipe (H), as close to the oil storage tank (A) as possible.
- Fit an oil filter (C) to the oil supply pipe, near the oil storage tank. If there is doubt about the internal condition of the oil supply pipe, fit an additional oil filter (recommended paper filter element) close to the boiler, but not inside the boiler casing.
- Fit a fire valve in accordance with BS5410. The fire valve (D) should be fitted externally to the building with the fire valve sensor (F) located within the appliance case.

  A capillary type valve provides a neat and simple installation. Alternatively, a fusible link or electrical system may be used.

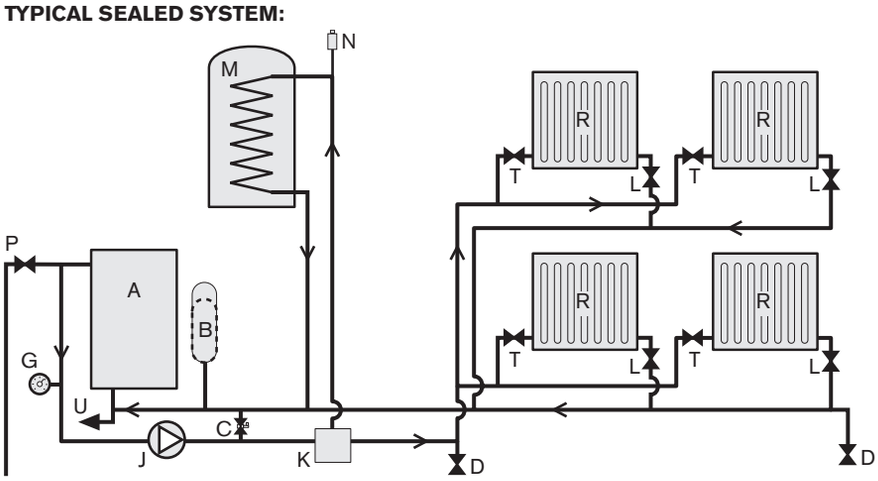
  Under no circumstances should a combination isolating/fire valve be used as the sole fire protection device.

TYPICAL OPEN VENT SYSTEM:



A - Appliance
B - Expansion vessel
C - Automatic bypass valve
D - Drain cock
E - Feed and expansion cistern
F - Feed and expansion 15mmØ min
G - Pressure gauge
H - Open vent 22mmØ min
J - Circulating pump
K - Zone valve
L - Lockshield valve
M - Hot water cylinder
N - Automatic air vent
P - Pressure relief discharge
R - Radiators
S - Static head
T - TRV
U - To filling system

TYPICAL SEALED SYSTEM:



PRIMARY SYSTEM PLASTIC PIPEWORK:

- Any plastic pipework must have a polymeric barrier with 1000mm (minimum) length of copper or steel pipe connected to the boiler.
- Do not use plastic pipework on sealed systems.
- Plastic pipework used for underfloor heating must be correctly controlled with a thermostatic blending valve limiting the temperature of the circuits to approx. 50°C. The pipework from the boiler to the blending valve must be in copper or steel (protected from corrosion).

PRIMARY SYSTEM/CONNECTIONS/VALVES:

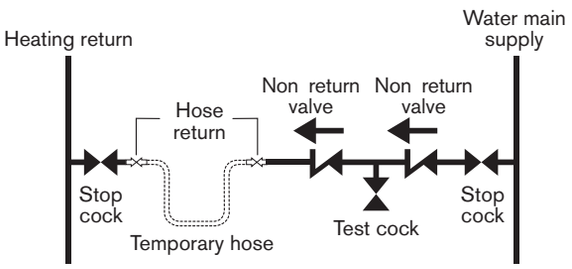
- **Do not use galvanised pipes or radiators.**
- All system connections, taps and mixing valves must be capable of sustaining a pressure of 3 bar.
- Radiator valves should conform to BS2767:10.
- All other valves should conform to BS1010.
- On new installations TRV's must be used on all radiators except the radiator where the room thermostat is sited, this must be fitted with lockshield valves and left open. All installations should have TRV's fitted to radiators within the sleeping accommodation.
- An automatic bypass valve must be connected between the heating flow and return where TRV's are used on all radiators.
- Drain cocks are required at all the lowest points on the system.
- Air vents are required at all high points on the system.

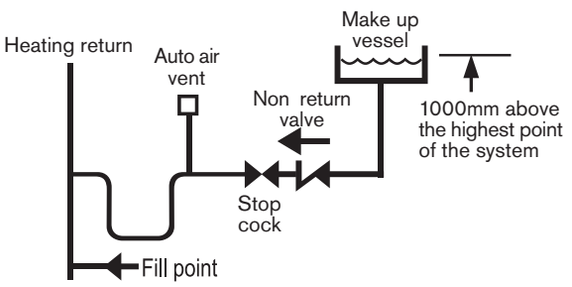
OPEN VENT PRIMARY SYSTEM:

- The feed and expansion cistern (E) must be positioned to provide a static head (S) of at least 1 metre above the highest point in the heating system to the water level in the feed and expansion cistern (E).
- The heating vent (H) and cold feed (F) pipes must rise continuously from the appliance.
- The heating vent pipe (H) must be at least 22mmØ.
- No valve shall be fitted in the open vent pipe (H) or the feed and expansion pipe (F).

FULLY PUMPED SEALED PRIMARY SYSTEM:

- A pressure relief valve (P) (spring loaded safety valve set to operate at 3 bar) must be fitted to the heating flow pipe as close as possible to the boiler or onto one of the boiler top 1" BSP outlets.
- An expansion vessel (B) must be fitted to the heating return pipe close to the boiler and pressurised for the system volume according to the instructions supplied with the vessel.
- A pressure gauge (G) (3 bar min.) must be fitted to the heating flow pipe or one of the boiler 1" BSP outlets.
- An automatic air vent (N) must be fitted.

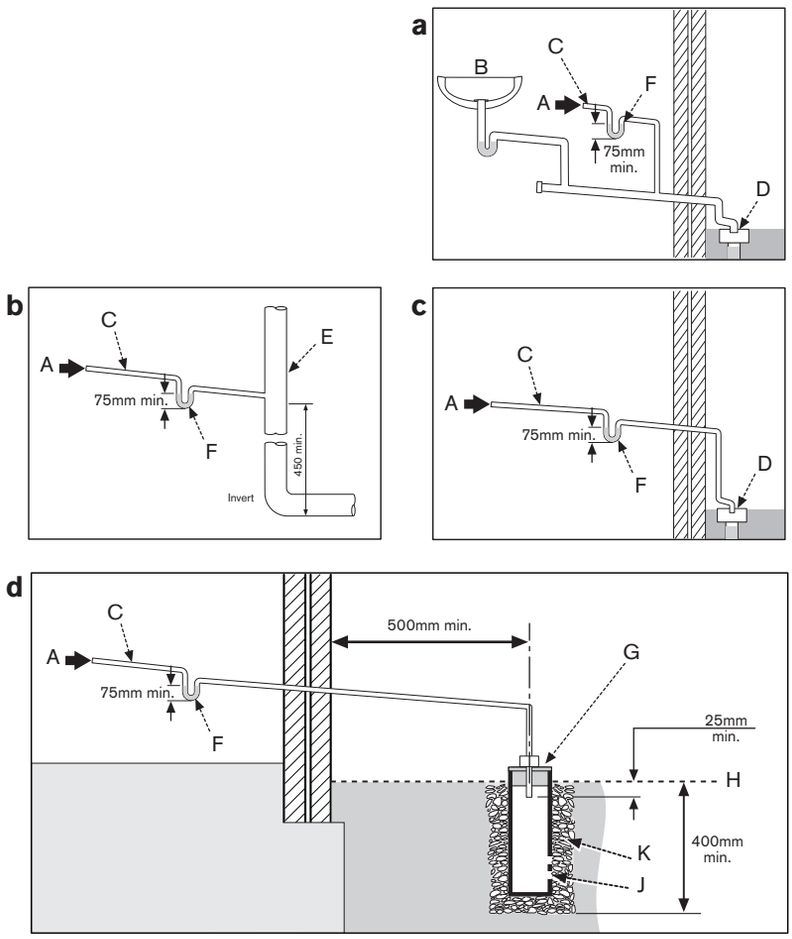




FILLING PRIMARY SEALED SYSTEMS:

- Filling the system must comply with one of the methods shown opposite.
- The filling point must be at low level and must never be a permanent direct fixing to the mains water supply.
- Filling loops must be WRAS approved.

CONDENSATE & PRESSURE RELIEF PIPEWORK



CONDENSATE PIPEWORK:

- The condensate pipe must be a minimum of 21.5mmØ polypropylene pipe.
- The condensate pipework must fall at least 50mm per metre towards the outlet and should take the shortest practicable route and not exceed 3 metres outside the building.
- The pipework must follow one of the options shown opposite:

  a - Internal waste drainage system

  b - Soil/vent stack

  c - External drainage system

  d - External condensate absorption point
- Use waterproof pipe insulation in exposed positions and for external pipework.

IMPORTANT: Condensate pipework must not leak and must discharge into a condensate trap filled with water before the boiler is started to prevent the possibility of potentially harmful flue products escaping via the condensate route.

A - Condensate from boiler

B - Sink

C - 21.5mmØ polypropylene condensate pipe

D - Gully

E - Internal soil and vent stack

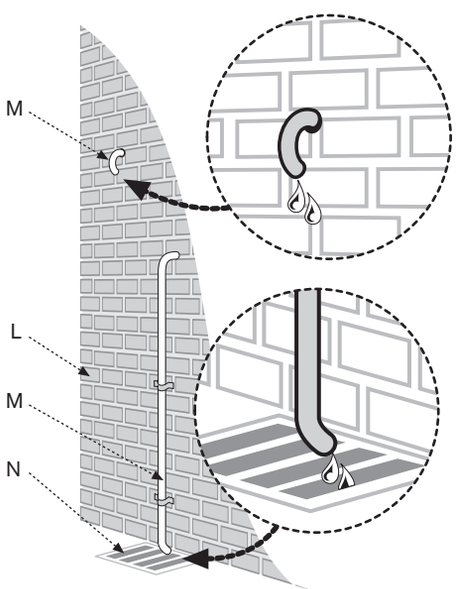
F - Condensate trap (75mm min)

G - 300mm x 100mmØ sealed plastic tube

H - Ground level

J - Drainage holes 50mm from base of tube (12mmØ at 25mm centres) facing away from building

K - Limestone chippings



PRESSURE RELIEF PIPEWORK:

IMPORTANT: The pressure relief valve is a safety device for the boiler and if activated may discharge boiling water or steam through the relief valve drain pipe.

Care should taken when siting the outlet pipe so that it does not cause an obstruction or discharge above a window, entrance or other public access where it could cause a hazard.

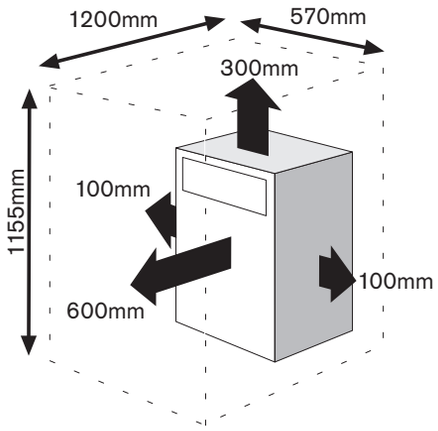
- The pressure relief drain pipe (M) should be at least 15mm diameter copper pipe and run downwards away from the boiler and discharge away from any electrics or other hazard, preferably to an external drain or soakaway.
- Pipe (M) should be finished with a partial bend, near the outlet to face the external wall (as shown) to help prevent freezing.
- Use waterproof pipe insulation in exposed positions and for external pipework.

L - Outside wall

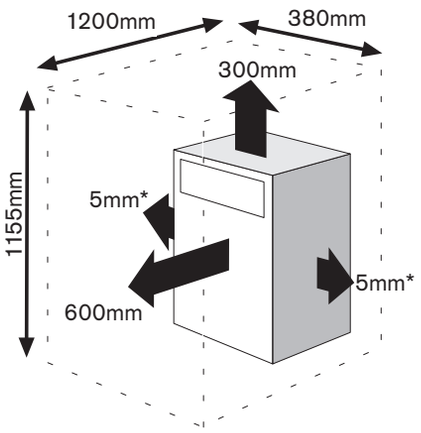
M - Drain pipe

N - External drain

a: RECOMMENDED INSTALLATION CLEARANCES



b: SERVICE CLEARANCES



BOILER LOCATION & CLEARANCES

- This boiler is only suitable for installing internally within a property at a suitable location onto a fixed rigid non-combustible surface at the same size as the boiler and capable of supporting the boiler weight.
- The boiler must be installed on a flat level surface to ensure condensate does not enter the primary heat exchanger.
- The boiler is not suitable for external installation unless a suitable enclosure is provided.
- Roof space installations must fully conform to BS5410 part 1 section 4.6.9

Open flue model (CF):

- In order to ensure clean and efficient combustion an adequate supply of air must be delivered to the combustion chamber.
- To provide sufficient air a suitable inlet must be provided into the room or space in which the boiler is situated, minimum size 110cm² for 18/25kW appliances.

An air brick or other form of continuous air supply may have to be built into the installation in order to ensure an adequate supply of air.

- If the appliance is to be installed in a confined space or compartment two air vents are required, one at high level and one at low level.

The minimum free area of each vent is shown opposite and depends whether the air is taken from another room or from outside the building.

- Where the air is taken from another room that room must contain an air inlet as described above.

Room sealed balanced flue model (RS):

The appliance does not require a separate vent for combustion air.

- Installation in cupboards or compartments require permanent vents for cooling purposes, one at high level and one at low level, either direct to outside air or to a room.
- Both vents must pass to the same room or be on the same wall to the outside air.

The minimum air vent free area is given in the table opposite.

a: INSTALLATION CLEARANCES:

Diagram (a) shows the minimum space recommended to **install** the boiler only.

b: SERVICE CLEARANCES:

Diagram (**b**) shows the minimum space required to **service** the boiler only.

The boiler is suitable for installing under a worktop providing that the front of the boiler is not enclosed and the worktop above the boiler (min. 10mm clearance) is easily removable to access the lock out reset and allow boiler maintenance.

** Remove the flue 'knock-out' panel sections if this clearance is less than 75mm.*

MINIMUM AIR VENT AREA (cm²) FOR APPLIANCES INSTALLED IN A COMPARTMENT:

[1]Internal air to and from a space/room inside the building. [2]External air to and from directly outside the building

Conventional flue:

	Internal[1] ventilation		External[2] ventilation	
kW	High Level	Low Level	High Level	Low Level
18/25	220	330	110	220

Room Sealed flue:

	Internal[1] ventilation		External[2] ventilation	
kW	High Level	Low Level	High Level	Low Level
18/25	220	220	110	110

BOILER LOCATION & CLEARANCES

c: COMPARTMENTS:

Follow the requirements of BS5410 and note:

- Minimum clearances must be maintained.
- An access door is required to install, service and maintain the boiler and any ancillary equipment.
- If fitting the boiler into an airing cupboard use a non-combustible material (if perforated, maximum hole sizes of 13mm) to separate the boiler from the airing space.

Venting compartments:

There must be sufficient clearance around the appliance to allow proper circulation of ventilation air. The clearances required for installation and servicing will normally be adequate for ventilation.

- Ventilation must be provided for boilers fitted into compartments as described in BS 5410.
- Free air must not be taken from a room or internal space containing a bath or shower and must not communicate with a protected area such as a hall, stairway, landing, corridor, lobby, shaft etc.
- Air vents must allow access for clean free air and must be sited to comply with the flue terminal position requirements.
- Air ducting runs must not exceed 3m.
- Low level air vents must be less than 450mm from the floor.
- A warning label must be added to the vents with a statement to the effect: ''Do not block this vent. Do not use for storage'.

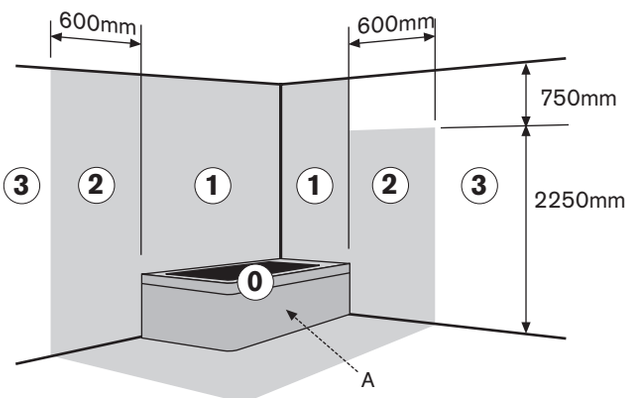
SHOWER / BATHROOMS:

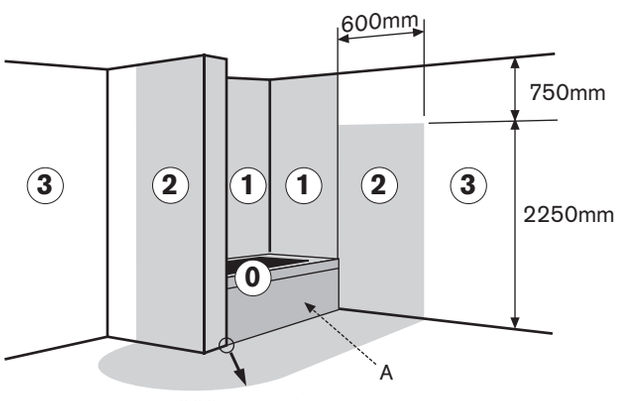
The boiler **must not** be installed in zones 0, 1 or 2 or in the shaded areas shown on the diagrams opposite.

IMPORTANT: conventional flued boilers must not be fitted in a bathroom.

IMPORTANT: any switch or appliance control using mains electricity must not be able to be touched by a person using the bath or shower.

Electrical switches, fused spur and socket outlets must not be situated in the bathroom.





600mm radius

A - Bath or shower cubicle (zone 0)

Minimum dimensions (mm) of flue terminal positions for oil-fired appliances:

	TERMINAL POSITION	CF	RS(H)	RS(V)
A	Below an opening (1, 2)	N/A	600	N/A
B	Horizontally to an opening (1, 2)	N/A	600	N/A
C	Below a plastic/painted gutter, drainage pipe or eaves if combustible material protected	N/A	75	N/A
D	Below a balcony or a plastic/painted, gutter, drainage pipe or eaves without protection to combustible material (3)	N/A	600	N/A
E	From vertical sanitary pipework	N/A	300	N/A
F	From an external or internal corner or from a surface or boundary alongside the terminal	N/A	300	N/A
G	Above ground or balcony level	N/A	300*	N/A
H	From a surface or boundary facing a terminal	N/A	600**	N/A
J	From a terminal facing the terminal	–	1200**	–
K	Vertically from a terminal on the same wall	N/A	1500	N/A
L	Horizontally from a terminal on the same wall	–	750	–
M	Above the highest point of an intersection with the roof	600	–	600
N	From a vertical structure on the side of the terminal	750	–	750
O	Above a vertical structure less than 750mm from the side of the terminal	600	–	600
P	From a ridge terminal to a vertical structure on the roof	1500	–	N/A

– Not applicable
N/A Not allowed
CF Conventional flue
RS(H) Room Sealed Horizontal flue
RS(V) Room Sealed Vertical flue

1 *An opening means an openable element, such as an openable window, or a permanent opening such as a permanently open air vent.*

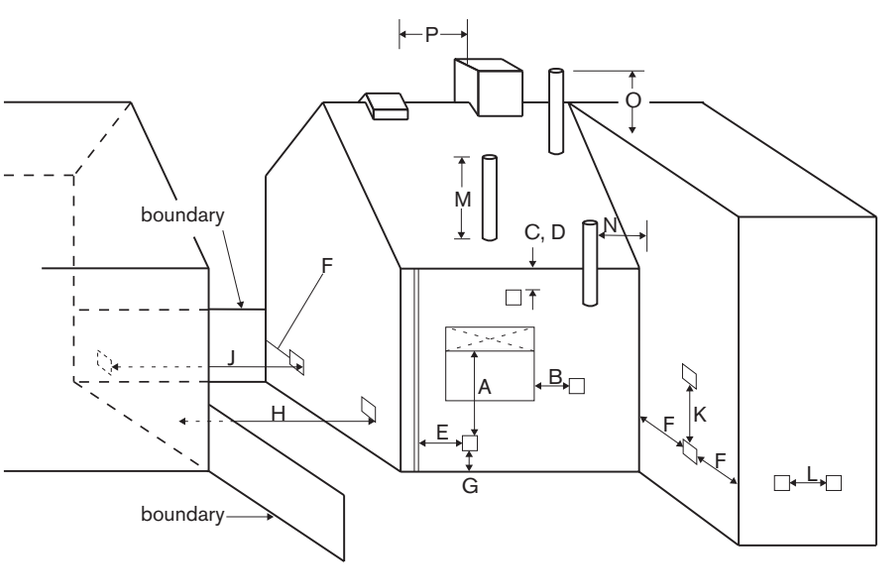
2 *Notwithstanding the dimensions above, a terminal should be at least 300mm from combustible material, e.g. a window frame.*

3 *A way of providing protection of combustible material would be to fit a heat shield at least 750mm wide.*

- Flue terminals must be positioned to avoid combustion products entering into buildings.
- The flue must be fitted and terminated in accordance with the recommendations of BS5410.
- The flue must not cause an obstruction.
- Discharge from the flue outlet must not be a nuisance.
- Flue gases have a tendency to plume and in certain weather conditions a white plume of condensation will be discharged from the flue outlet which could be regarded as a nuisance, for example, near security lighting.
- There should be no restriction preventing the clearance of combustion products from the terminal.
- The air inlet/outlet duct and the terminal of the boiler must not be closer than 25mm to any combustible material. Detailed recommendations on protection of combustible materials are given in BS 5410:1.
- A protective terminal guard must be fitted if the terminal is 2m or less above a surface where people have access.

  The guard must be spaced equally (minimum 50mm) around the flue and fixed to the wall with plated screws.

See 'Contact Information' on the inside front cover for flue guard information.



- The following additional guidelines (from part L Exceptions Guidance Document) are recommended when determining the flue outlet position:

  • Avoid discharging flue gases into car ports or narrow passageways.

  • *Minimum distance of the flue terminal above ground is 2100mm where directed to a public footpath, private access route or a frequently used area and 2500mm from a car parking area.

  • **Minimum distance of the flue terminal to a facing wall, fence, building or property boundary is 2500mm.

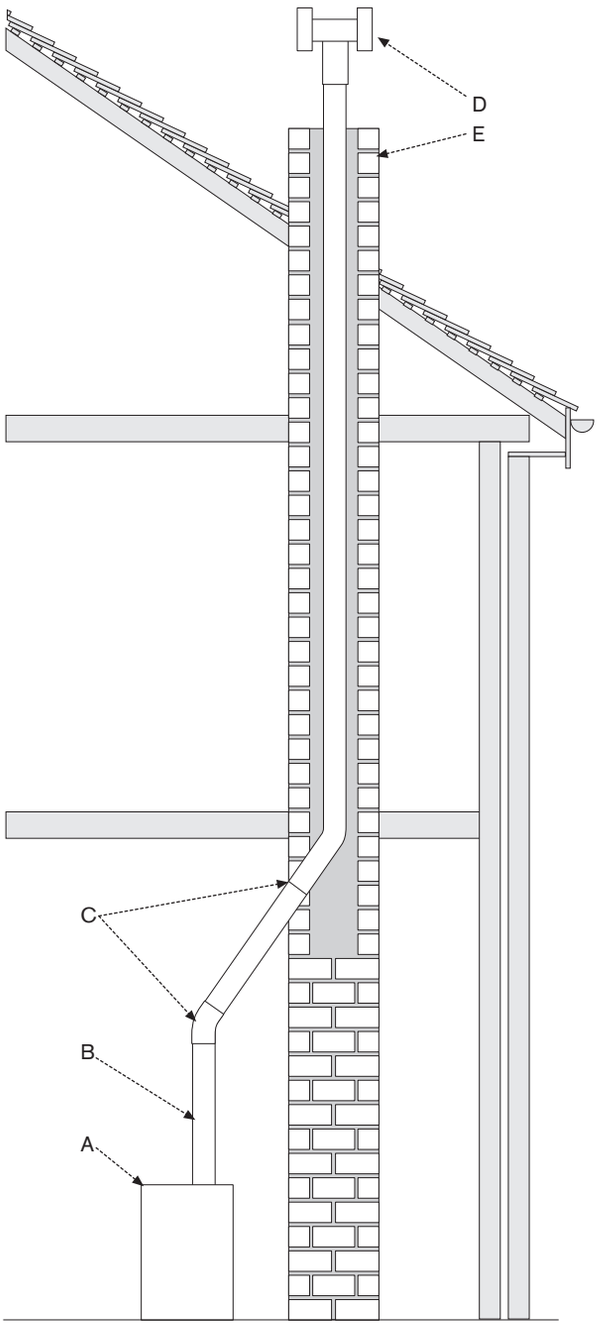
CONVENTIONAL FLUE

- Open (conventional) flued appliances must not be installed in a bedroom, bathroom or bedsitting room.
- The flue system must be in accordance with BS5410 : Part 1 and the current Building Regulations.
- The flue must be constructed of materials suitable for the use of condensing combustion products.
- External flue systems must be of the insulated type.
- Brick and masonry chimneys must be lined with a suitable non-combustible material and properly jointed to withstand the effects of the working temperature (minimum rating of material 120°C) of the appliance and any condensate which may form.
- All flue joints must be sealed to prevent the leakage of condensate and combustion products.
- Ensure that joints are made so that the condensate runs away and is not collected within the joint.

NOTE: The flue can be increased in size from the boiler take off point providing the joint is correctly sealed. Never reduce the flue diameter from the boiler take off point.

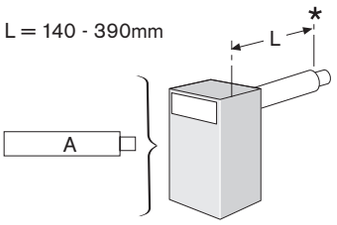
- The flue should be vertical and contain as few bends as possible, a maximum of two 135° bends should be used.
- The flue outlet must be extended beyond the eaves of the building and where possible, above the apex.
- Fit a suitable anti down-draught terminal where down draughts are experienced.

Manufacturers of conventional flue systems suitable for this appliance are listed under 'Contact Information' on the inside front cover.

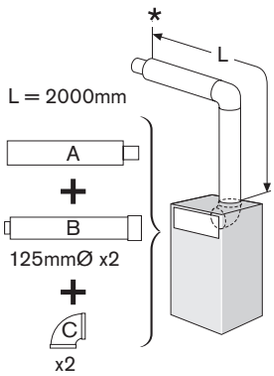


A - Boiler
B - Flue
C - Max. 2 bends at 135°
D - Anti down-draught terminal
E - Chimney

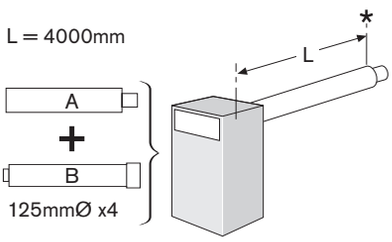
L = 140 - 390mm



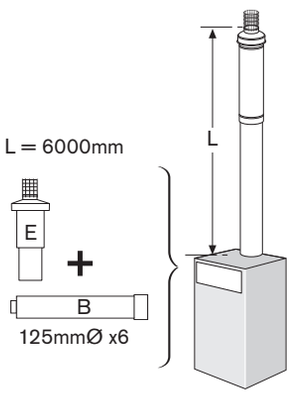
L = 2000mm



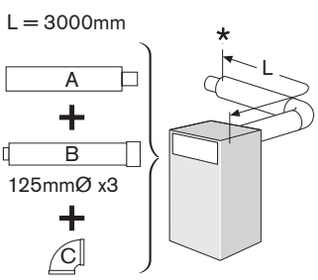
L = 4000mm



L = 6000mm



L = 3000mm



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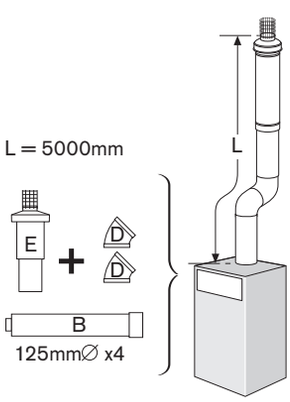
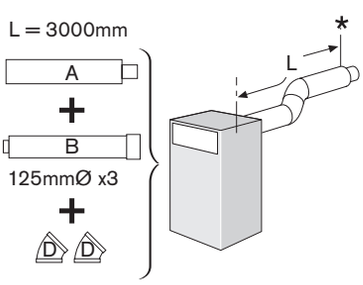
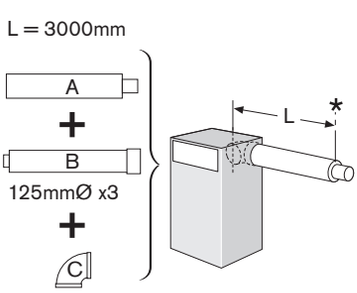


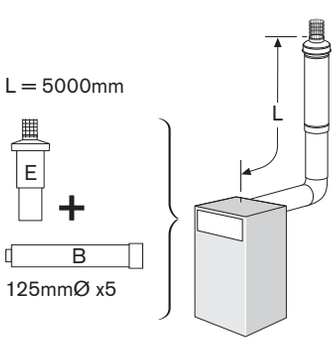
L = 3000mm



L = 3000mm



L = 5000mm



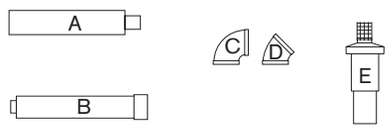
ROOM SEALED FLUE OPTIONS

The diagrams (opposite) show the components used and the maximum flue length (L) for each flue configuration.

- To achieve the maximum flue length (L), a flue section will have to be reduced in length.
- Only the flue terminal or straight flue extensions can be reduced in length by cutting.
- The flue terminal end can be fitted from the inside or outside of the building.

IMPORTANT:

All horizontal sections must rise away from the boiler by 52mm per metre (3°) to allow the condensate to drain back to the boiler.



A - Horizontal terminal

B - Straight flue extension

C - Flue bend 90°

D - Flue bend 45°

E - Vertical Terminal Kit (incl. 90° elbow)

Calculating the flue length:

Measure the total flue length required, noting that the maximum straight flue length including the terminal is:

Horizontal 80/125mmØ: 4000mm (excluding 120mm of terminal extending outside the building).

Vertical 80/125mmØ: 6000mm (including the vertical flue kit 90° elbow).

Then reduce the total straight flue length for each extra flue bend (excluding the vertical flue kit 90° elbow) by:

1000mm for 90°

500mm for 45°

Flue Extension lengths:

Horizontal & Vertical 80/125mmØ: 1000mm overall length.

Effective length when engaged into sockets within the flue run is 950mm.

Flue Terminal lengths:

Horizontal 80/125mmØ: 720mm

Vertical 80/125mmØ: 1080mm + cage.

*** to outside wall.**

IMPORTANT: All the previous Pre-Installation sections must be read and requirements met before starting boiler or flue installation.

UNPACKING THE BOILER

Unpacking:

1 ▶ Cut the ties securing the carton taking care not to pierce the carton or cause personal injury.

2 ▶ Open the top flaps of carton and lift carton up and away from the boiler.

▶ Remove the plastic bag and upper front protection cover from the boiler and place safely aside.

3 ▶ Pull base of front panel (E) away from the boiler to disengage ball stud connectors.

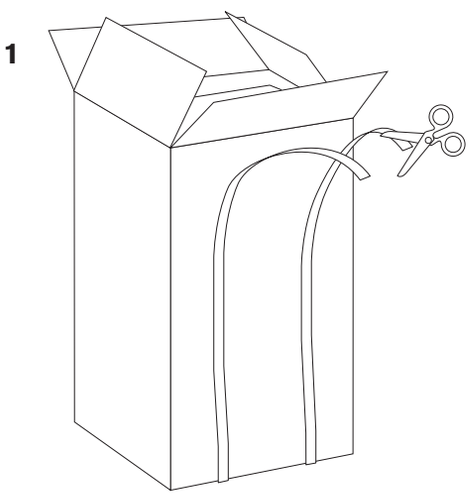
▶ Lift front panel (E) upwards off the top supporting ledge and store safely away from the working area.

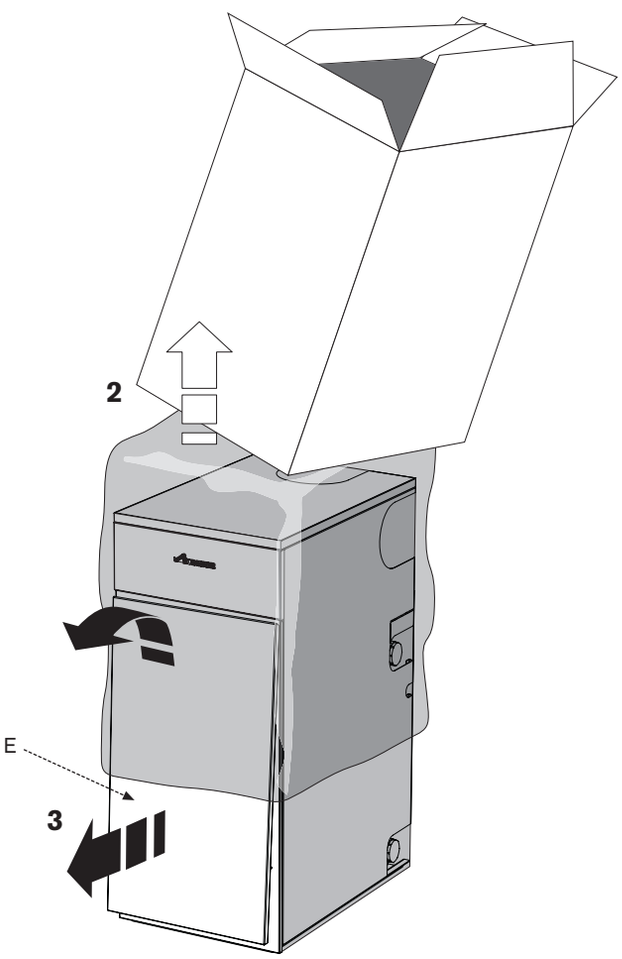
▶ At least two or more persons are required to move the boiler, taking care not to damage the boiler, panels or the floor.

At all times the correct method for handling heavy objects should be strictly observed.

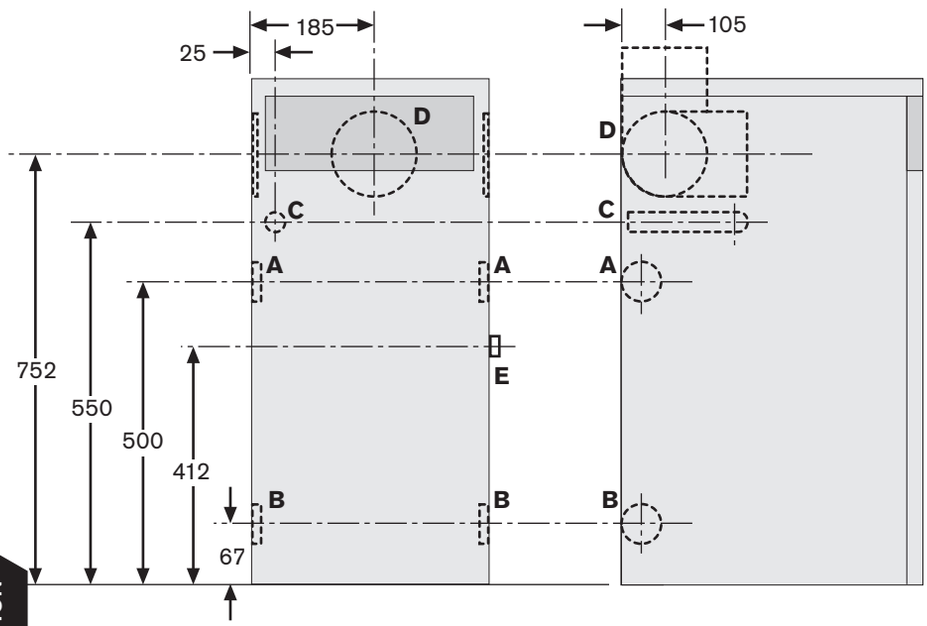
GENERAL HANDLING GUIDELINES:

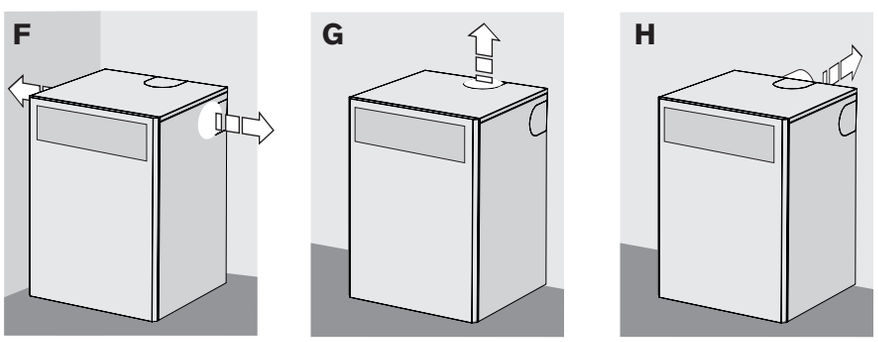
- Lift only a manageable weight, or ask for help.
- When lifting, bend the knees, and keep the back straight and feet apart.
- Do not lift and twist at the same time.
- Lift and carry items close to the body.
- Wear protective clothing and gloves to protect from any sharp edges.

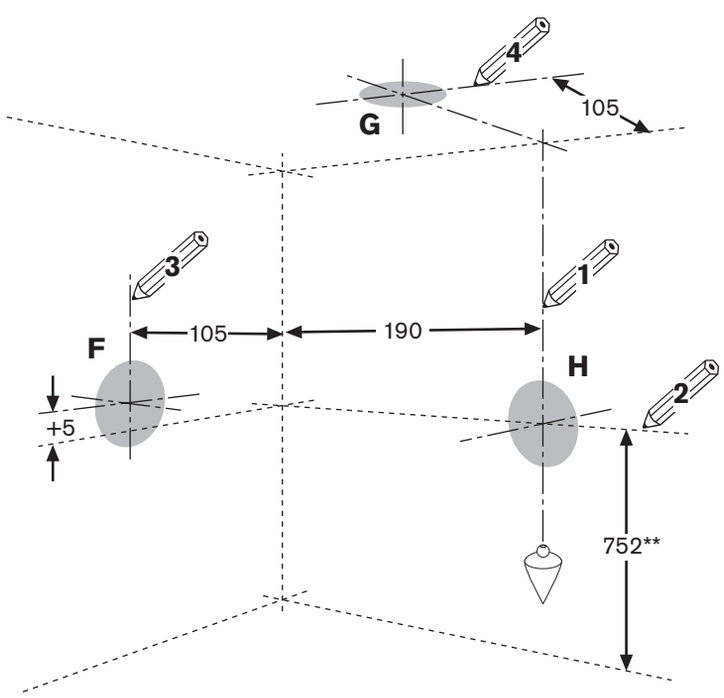




All dimensions in mm







PIPEWORK POSITIONS & FLUE OPENING

CAUTION: Ensure there are no pipes, electric cables, damp proof course or other hazards before drilling.

SAFETY:

All relevant safety precautions must be undertaken. Protective clothing, footwear, gloves and safety goggles must be worn as appropriate.

PIPEWORK POSITIONS:

A to D (opposite) show the pipe positions from the front of the boiler:

A - CH flow/heating vent 1"Ø BSP

B - Primary drain/cold feed 1"Ø BSP

C - CH return 22mmØ copper

D - Flue outlet

E - Condensate outlet 21.5mmØ

NOTE: For servicing purposes, keep the condensate and pressure relief discharge pipes away from components and pipework connections.

FLUE OPENING:

- Follow the diagram opposite to mark the centre of the flue (1, & 2) for rear opening, (2 & 3) for side opening or (1 & 4) for top opening.

  **** IMPORTANT: for horizontal flues, increase this height by 52mm for every 1000mm of horizontal length that the flue opening is away from the boiler**

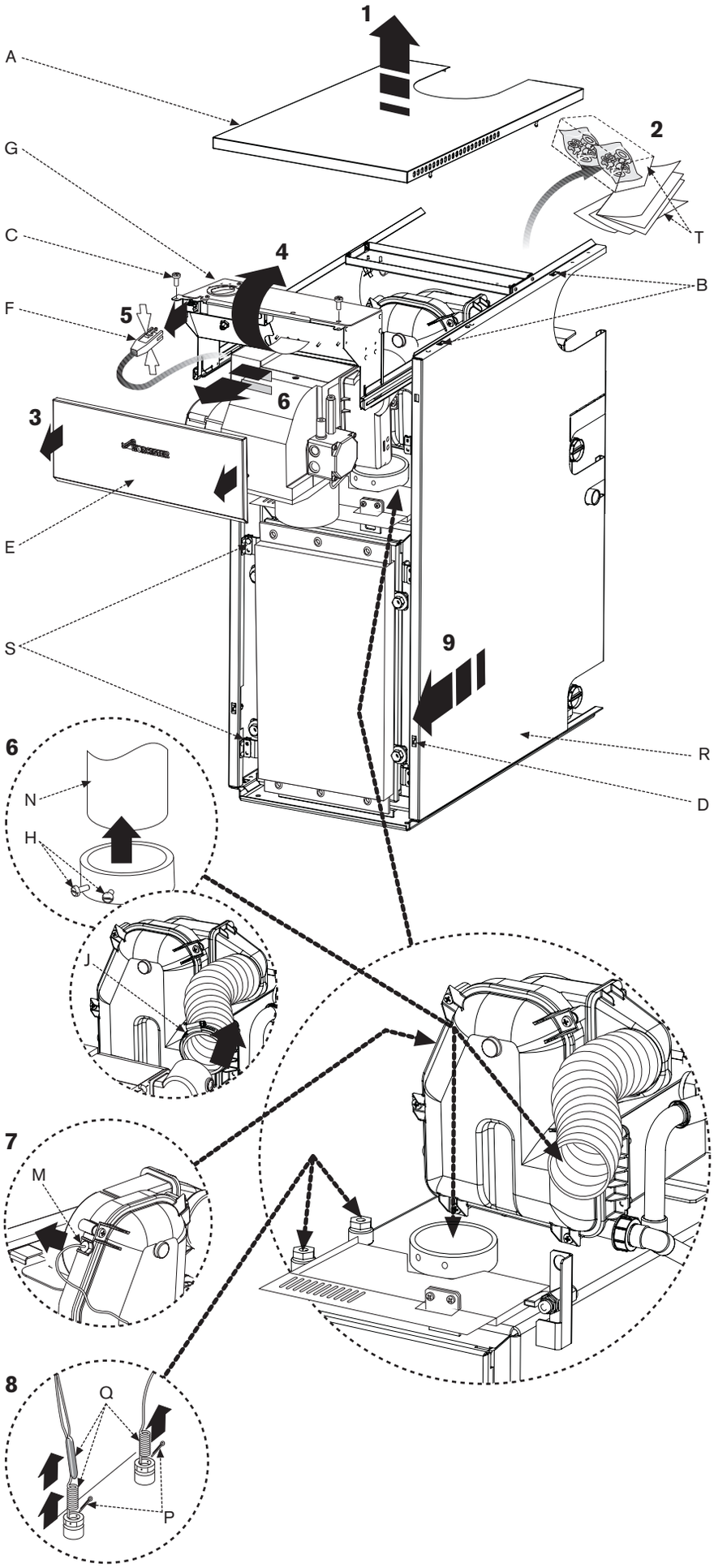
NOTE: all horizontal flue sections must rise away from the boiler by 52mm per metre to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.

- Make an opening (F, G or H) through the wall using a core drill or similar at a size relative to the wall thickness as shown below:

125mmØ flue:	
Wall thickness	**Flue hole size**
150 - 240mm	155mmØ
240 - 330mm	160mmØ
330 - 420mm	165mmØ
420 - 500mm	170mmØ

- Clear away any debris.

BOILER PANEL REMOVAL



1 ▶ Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove.

2 ▶ Extract the installation and literature packs (T).

3 ▶ Pull the top front panel (E) away from the boiler to disengage the ball stud connectors and remove.

4 ▶ Remove retaining screws (C) from each side of the control box (G).

▶ Slide control box (G) outwards to its full extent.

▶ Pivot control box (G) upwards and secure in the position as shown.

5 ▶ Depress locking ears to unplug burner lead (F) from control box (G).

6 ▶ Release burner retainers (H).

▶ Loosen clip (J) and disconnect the air inlet pipe.

▶ Lift burner up to release combustion head (N) from heat exchanger and store safely away from the boiler.

7 ▶ Release split pin to remove the flue thermostat (M) from the flue hood.

8 ▶ Release split pins (P).

▶ Carefully remove the overheat thermostat phial (Q) (automatic reset) from the rear heat exchanger thermostat pocket.

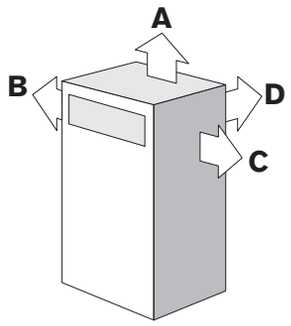
▶ Carefully remove the control thermostat and High Limit manual reset thermostat phials (Q) from the front heat exchanger thermostat pocket.

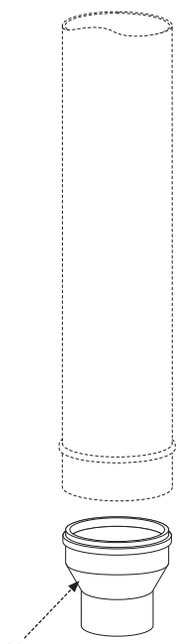
9 ▶ Unscrew side panel (R) retaining screws (S) from both sides.

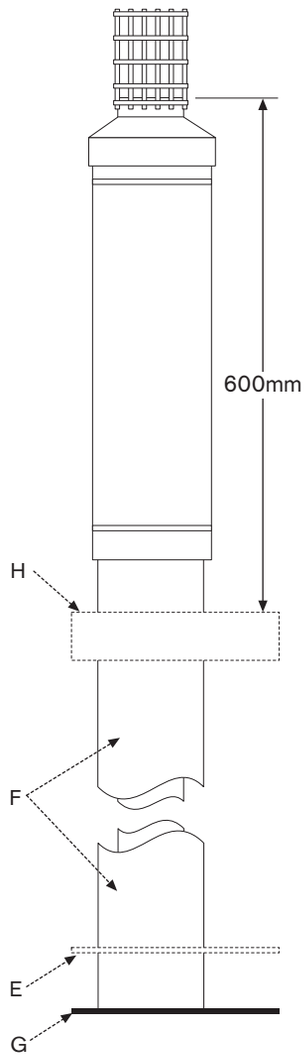
▶ Slide both side panels together with the top support bracket and control box (G) forwards to release the side panel retaining lugs.

▶ Remove and store safely away from the boiler.

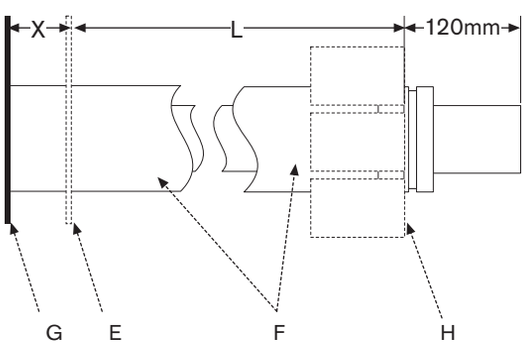
Note: to enable the panels to stand upright, reposition and secure the control box (G) to the side panels.

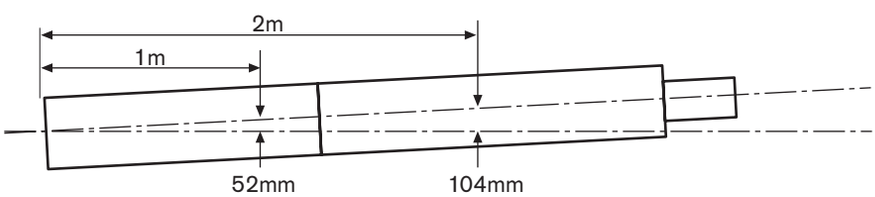






E - Boiler outer casing
F - Outer flue tube
G - Outer/elbow connection
H - Outside wall/roof
K - CF adaptor





FLUE INSTALLATION

The flue can exit the boiler from outlets A, B, C or D allowing vertical (RS & CF) and horizontal (RS low or high level) flues to be fitted. (CF position 'A' only).

Refer to the separate flue installation instructions supplied with the flue kits available for this boiler:

RS FLUE KITS & COMPONENTS 80/125mmØ (not supplied):

Horizontal flue kit: Part No. 7-716-190-031

Vertical flue kit: Part No. 7-716-190-032

Extension kit (1 metre) x1: Part No. 7-716-190-033

Inline elbow 90° x1: Part No. 7-716-190-034

Inline elbow 45° x2: Part No. 7-716-190-035

Horizontal terminal guard: Part No. 7-716-190-050

CF FLUE KITS 80/100 & 103mmØ (not supplied):

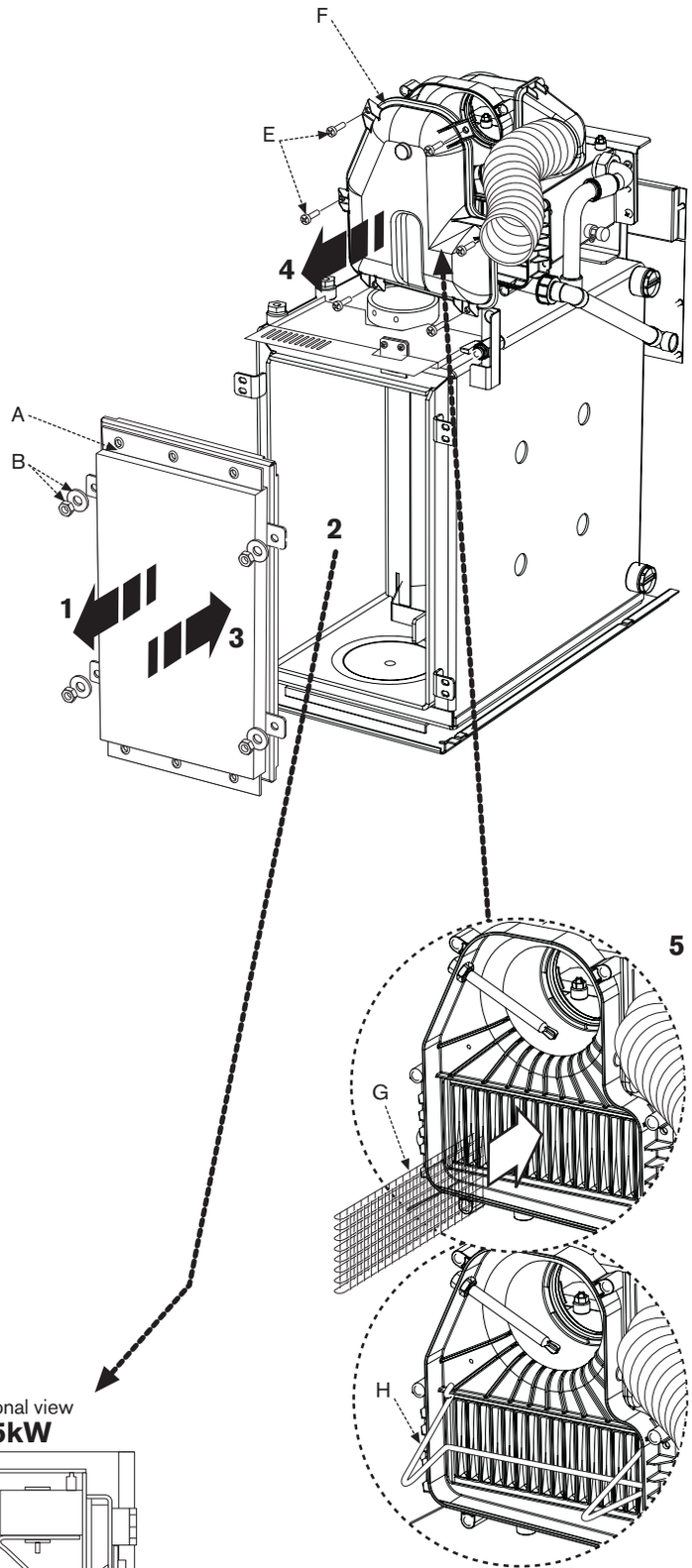
CF Vertical flue kit: Part No. 7-716-190-036

INSTALLATION NOTES:

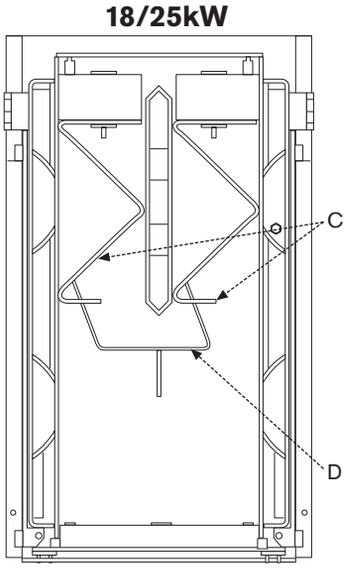
- Ensure all flue seals are in good condition and seated properly.
- To ease assembly of flue components, grease seals lightly with the solvent-free grease supplied.
- Use flue clamps to support the flue system.

IMPORTANT: The boiler is not designed to take the weight of the flue system, this must be supported externally to the boiler.

- All horizontal flue sections must rise by at least 52mm for each metre away from the boiler to ensure that condensate flows back into the boiler for safe discharge via the condensate waste pipe.



Plan sectional view
18/25kW



COMBUSTION CHAMBER

Combustion chamber:

1 ▶ Release retaining nuts and washers (B).

▶ Remove combustion chamber access door (A).

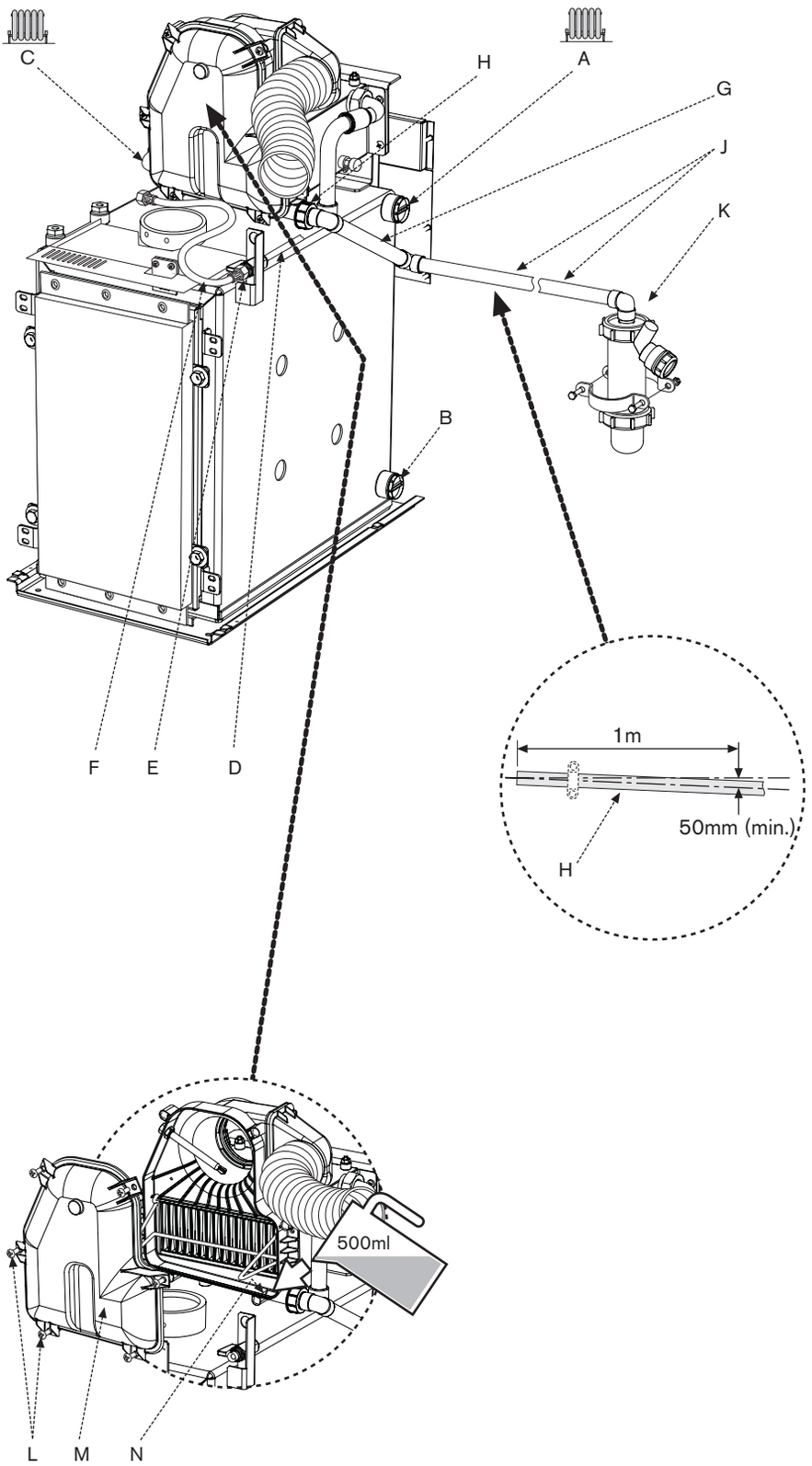
2 ▶ Ensure the baffles (C) and baffle retainer (D) are correctly fitted for the boiler output as shown in the plan view opposite.

3 ▶ Refit combustion chamber door (A).

▶ Secure with nuts and washers (B) and tighten until the door is firmly secured, do not overtighten the nuts.

4 ▶ Unscrew screws (E) and remove flue manifold access cover (F).

5 ▶ Check that all the baffles (G) and baffle retainer (H) are correctly fitted to the secondary heat exchanger.



CAUTION: ISOLATE THE OIL & WATER MAINS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

A - CH flow/heating vent 1"Ø BSP
B - Primary drain/cold feed 1"Ø BSP
C - CH return 22mmØ copper
D - Oil supply pipe (10mmØ) - not supplied
E - Oil pipe isolating valve
F - Flexible oil pipe
G - Condensate outlet (21.5mmØ) - supplied
H - Flue manifold condensate outlet
J - Condensate pipe - not supplied
K - Condensate trap with wall clamp - supplied

WATER CONNECTIONS:

- Remove the transit bungs from the pipework connections on the boiler.

  Note: that surplus water may be present due to factory testing.
- Ensure all pipework is clean.
- Align water pipework and connect.
- Check that all unused sockets have been capped.

OIL SUPPLY CONNECTIONS:

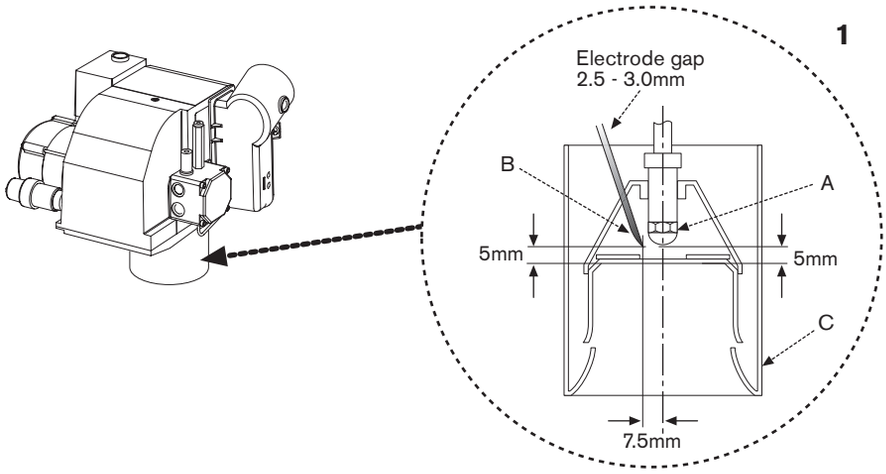
- Route the oil supply pipe (D) along either side of the boiler as required and connect to the isolating valve (E). Ensure the valve is closed.
- Connect the flexible oil pipe (F) to the isolating valve (E).

CONDENSATE CONNECTION:

- Measure condensate pipe (G), mark and cut square to length required.
- Fit sealing washer to condensate waste pipe (G) and connect to the flue manifold outlet (H).
- Connect 21.5mm polypropylene pipe (J) (not supplied) to the condensate waste pipe (G) and condensate trap (K) before terminating to waste.
- Secure the water trap (K) with clamp supplied.
- Ensure that the condensate pipe runs away from the boiler at a constant fall of 50mm (min.) for every metre.
- Seal all condensate pipe joints.
- **Carefully pour 500ml of water into the condensate collection (N) to fill condensate trap.**
- Check the water is running away and the condensate pipework joints are water tight.
- Refit manifold access cover (M) and secure with screws (L).

IMPORTANT:

The condensate trap must be correctly filled to prevent the possibility of potentially harmful flue products escaping via the condensate pipework.



CAUTION: ISOLATE THE OIL MAINS SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

1 ▸ Check the nozzle (A) and electrode (B) settings are correct for the relevant burner as shown opposite.

▸ Ensure nozzle (A) is aligned central within the combustion head (C).

▸ Inspect for any visible defects.

OIL PUMP:

Connecting the oil pump for a single pipe system:

The pump is factory set for single pipe operation with the flexible oil pipe fitted.

▸ Check connections before use.

Connecting the oil pump for a double pipe system:

1 ▸ Check the inlet pipe connection.

a) DANFOSS BFP 11 L3:

▸ Remove pump front cover (A) ensuring a suitable receptacle is used to catch any oil residue.

▸ Remove changeover screw (B).

▸ Remove horseshoe washer (C).

▸ Refit changeover screw (B).

▸ Refit front cover (A).

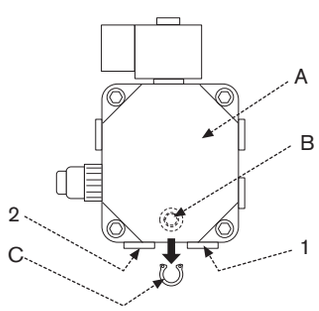
▸ Remove oil pump return plug (2).

b) SUNTEC AS47C:

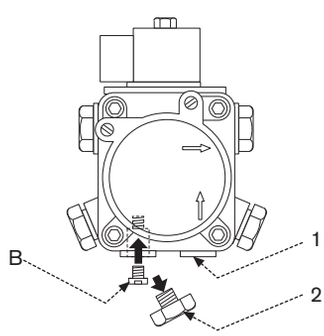
▸ Remove return port plug (2) and insert grub screw (B).

2 ▸ Connect the flexible oil pipe **return** hose to the pump return and tighten to secure.

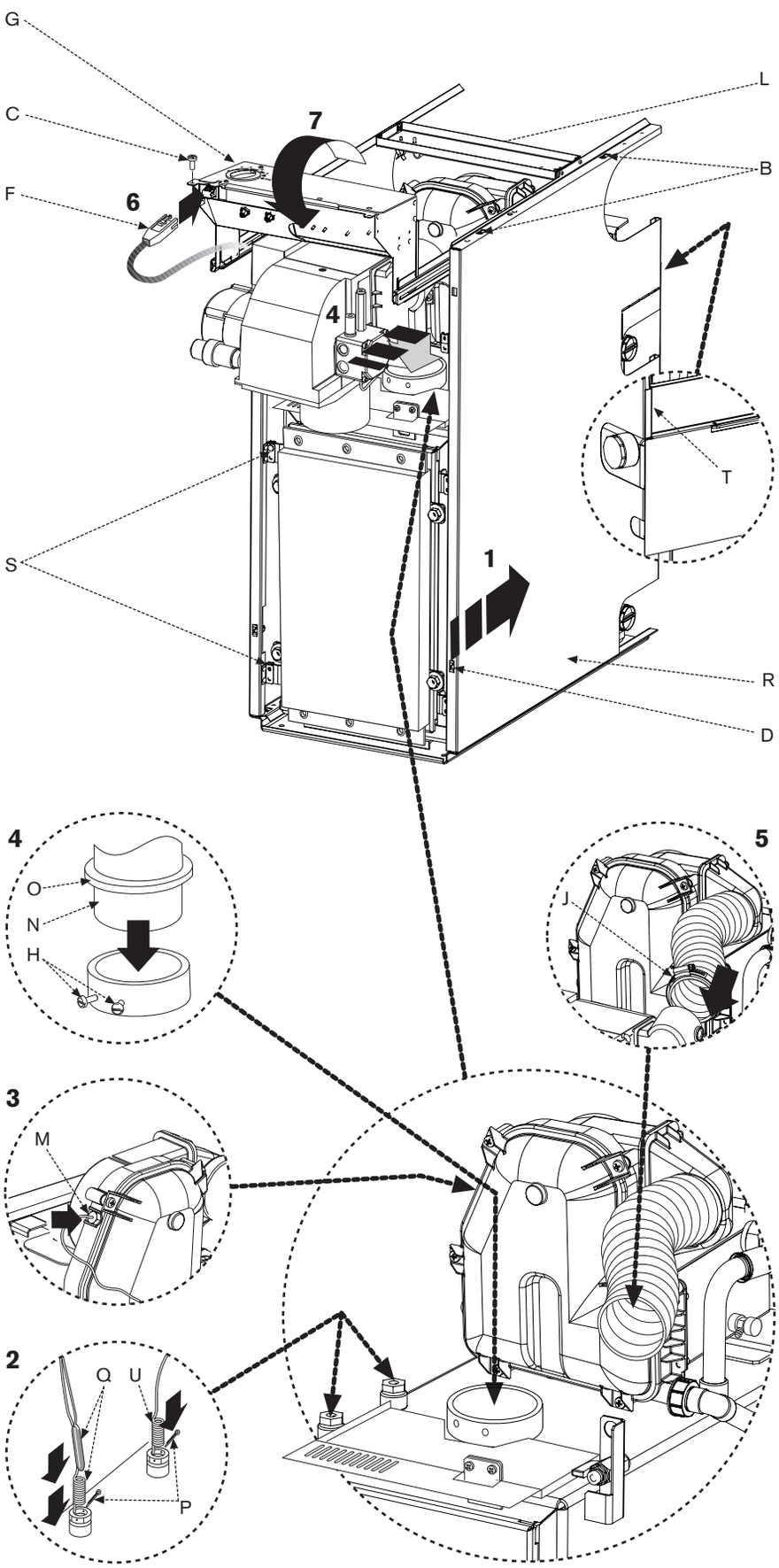
a) DANFOSS BFP 11 L3 OIL PUMP



b) SUNTEC AS47C OIL PUMP



REFIT COMPONENTS



1 ▶ Slide side panels (R) and top support bracket (L) together with control box (G) along base rails and push to secure into the retaining lugs on the baseplate and align with the lugs on the rear support panel (T).

▶ Release control box (G) if secured.

2 ▶ Carefully replace the control and high limit manual reset thermostats (Q) into the front thermostat pocket and the auto reset overheat thermostat (U) into the rear thermostat pocket.

▶ Refit split pins (P) to secure.

3 ▶ Carefully replace the flue thermostat (M) into the flue hood and refit split pin to secure.

4 ▶ Align burner combustion head (N) into boiler housing tube with gasket (O) correctly fitted.

▶ Push firmly down to compress the gasket (O).

▶ Tighten burner retainers (H) sufficiently to ensure a good seal.

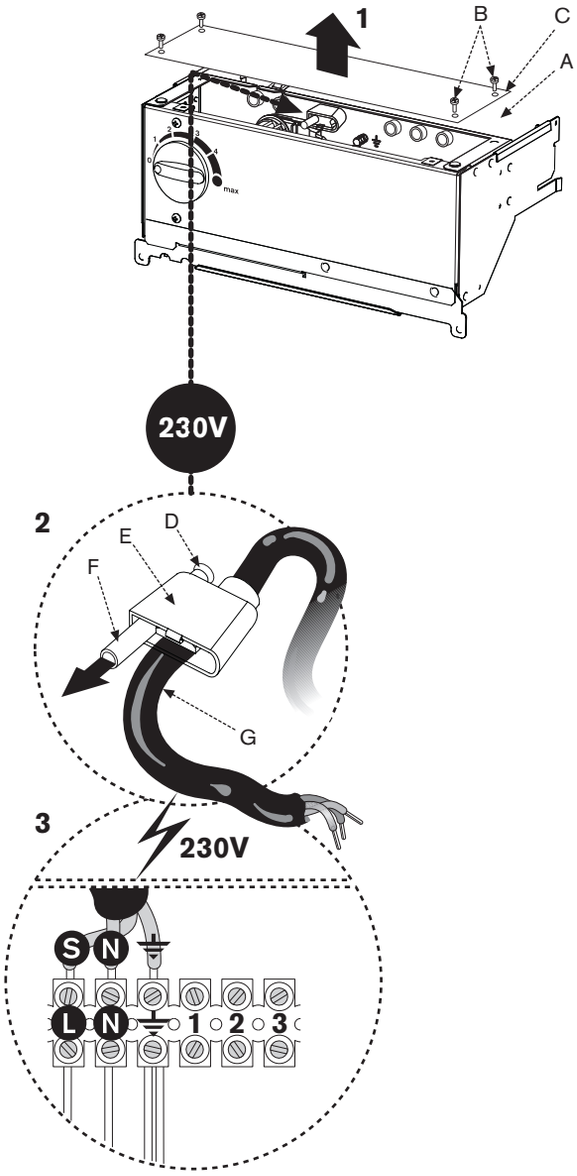
IMPORTANT:

Ensure the gasket is a good seal between the burner combustion head and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.

5 ▶ Attach air duct pipe and tighten clip (J) to secure to the burner air intake.

6 ▶ Plug burner lead (F) into control box (G).

7 ▶ Pivot control box (G) and slide into boiler casing.



= EARTH
L = LIVE
N = NEUTRAL
S = SWITCHED LIVE

ELECTRICS

DANGER - 230V:
ISOLATE THE MAINS ELECTRICITY SUPPLY BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

IMPORTANT: OBSERVE ELECTRONIC STATIC DISCHARGE PRECAUTIONS. DO NOT TOUCH THE PCB CIRCUITS

Access to 230V connections:

1 ▸ Release screws (B) and remove cover panel (C) from control box (A).

2 ▸ Release screw (D) from cable clamp (E).

▸ Pull inner clamp part (F) outwards.

▸ Feed sufficient power cable (G) through the cable clamp (E) and secure grip with screw (D).

▸ Separate wires from cable end and strip to 6mm.

230V connections:

3 ▸ Connect **SWITCHED LIVE** wire (Brown or Red) to terminal (**L**).

▸ Connect **NEUTRAL** wire (Blue or Black) to terminal (**N**).

▸ Connect **EARTH** wire (Green/Yellow) to the terminal (⏚).

Route the power cable to the connection point avoiding any potentially hot surfaces with sufficient cable to move the control box into the service position. Open the control box into the service position to check the cable length and routing.

Any external device connected to the boiler must take its power supply from the boiler supply only and must NOT have a separate power supply.

See the following pages of electrical diagrams for details of different systems.

Refit electric control panel cover:

▸ Refit cover panel (C) to control box (A) and secure with screws (B).

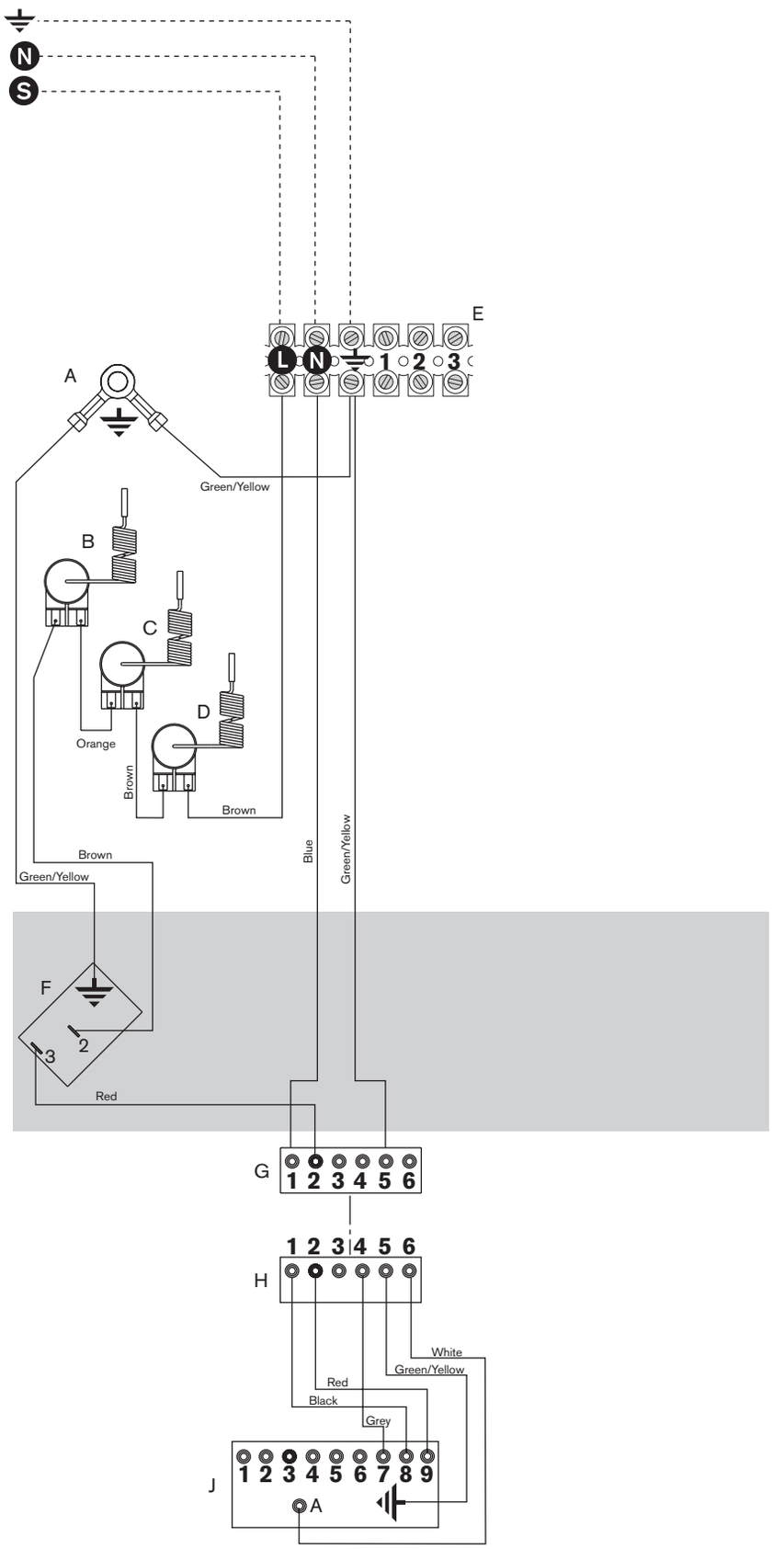
= EARTH
L = LIVE
N = NEUTRAL
S = SWITCHED LIVE

ELECTRICS

230V STANDARD WIRING DIAGRAM:

Key to components:

A - EARTH STUD
B - HIGH LIMIT THERMOSTAT
C - BOILER MANUAL RESET THERMOSTAT
D - FLUE MANUAL RESET THERMOSTAT
E - TERMINAL CONNECTOR BLOCK
F - CONTROL THERMOSTAT
G - BURNER CONTROL SOCKET
H - BURNER CONTROL PLUG-IN CONNECTOR
J - BURNER CONTROL BOX



PRE-WIRED REMOTE 2 OR 3 PORT VALVE CONTROL SET USING REMOTE PROGRAMMER:

Key to components:

K - REMOTE JUNCTION BOX (10-way) to connect the following:

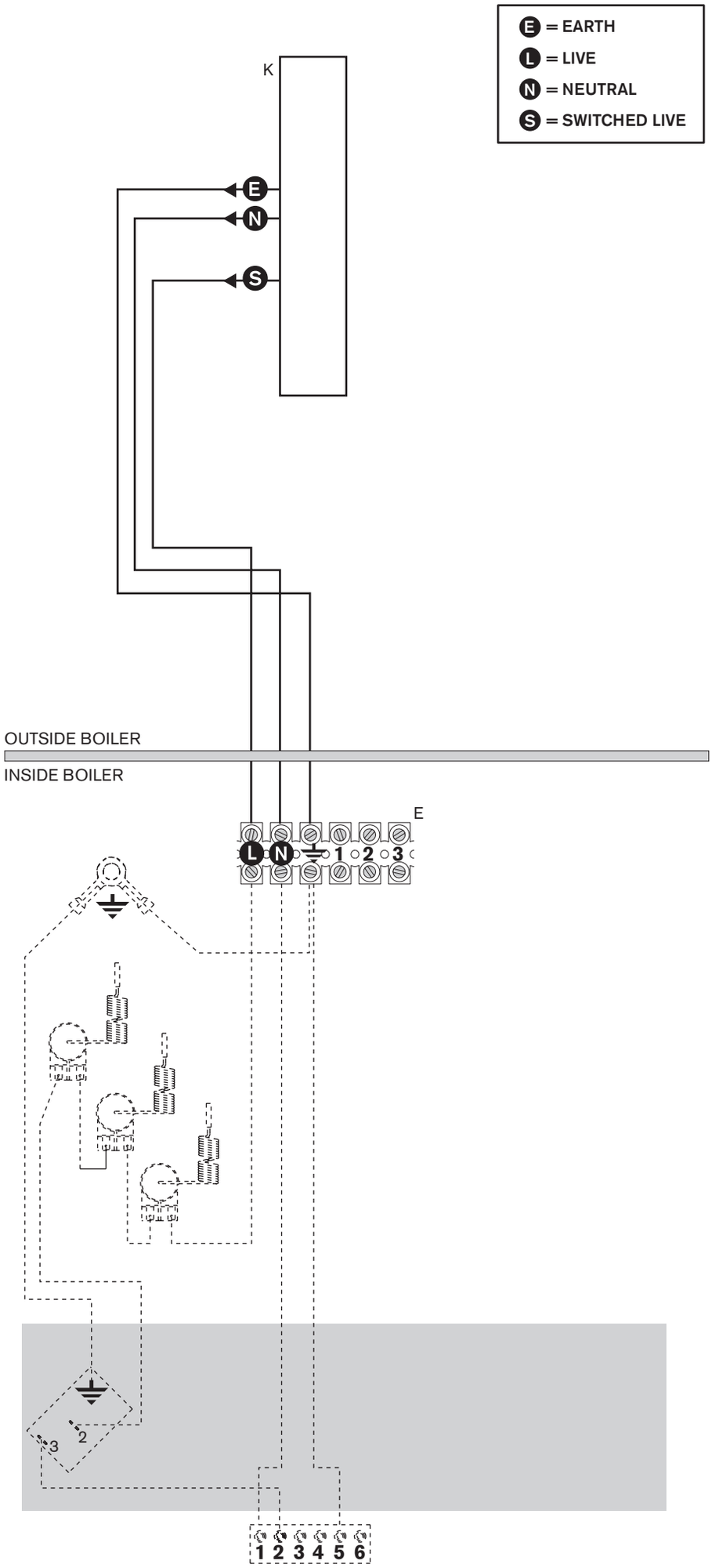
- Mains wiring 230V 50Hz
- Hot water tank thermostat
- Room thermostat
- System water valves
- Circulating pump
- External programmer

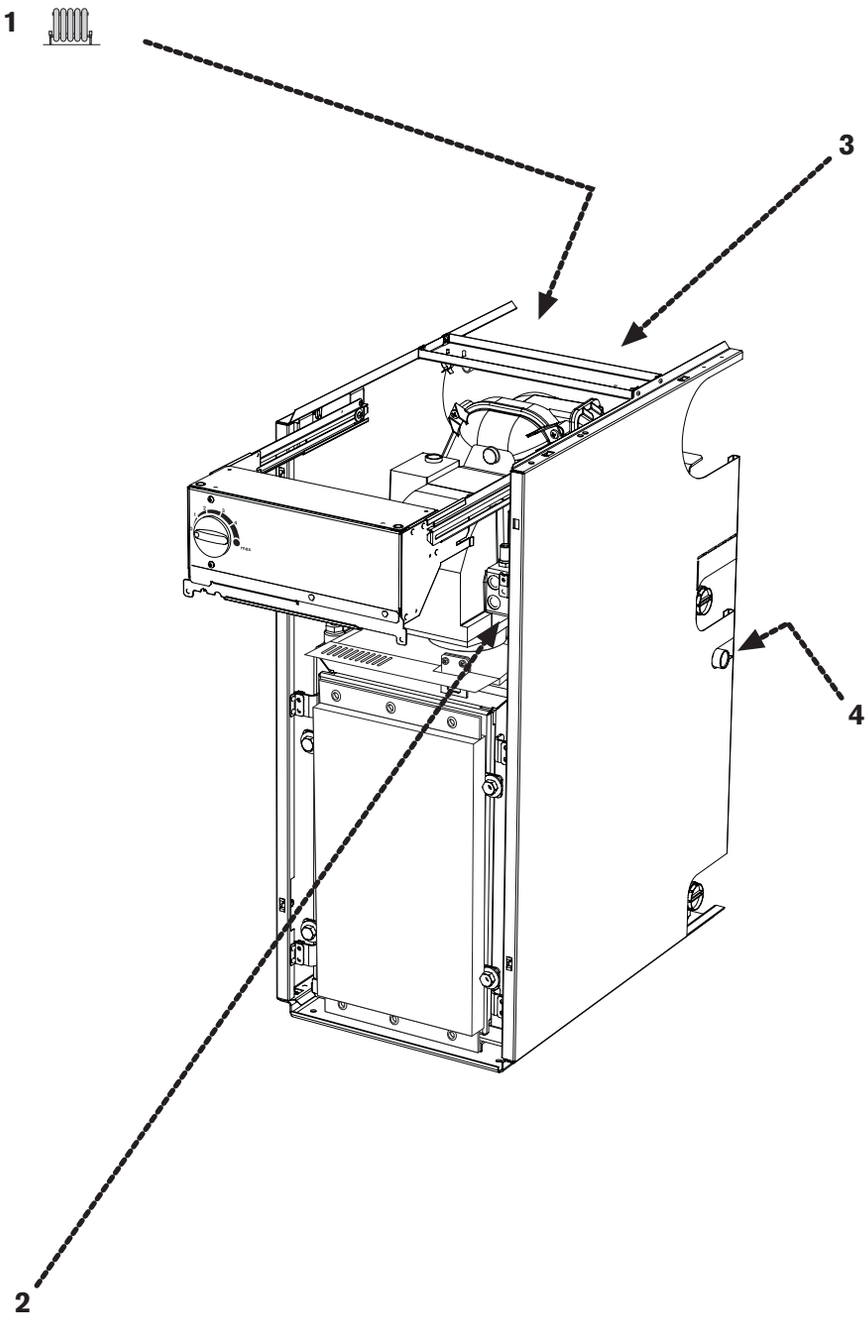
E - TERMINAL CONNECTOR BLOCK

Remote (10 way) junction box (K) requirements:

- the junction box (K) must be a terminal block type, current rated to at least 5 amps.
- a 5 amp fuse must be fitted to the mains supply.
- the junction box (K) must be fitted externally to the boiler.

A frost thermostat can also be connected to the remote junction box if required.





CAUTION: ISOLATE THE MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

1 ▸ Check that the service and water pipes are connected correctly.

▸ Check that all unused sockets are capped.

2 ▸ Check that the oil supply is 28 sec Kerosene and that the pipework is connected correctly to the oil pump.

▸ Turn on the main oil supply valve at the tank and check the oil supply pipework, connections and rectify any leaks.

3 ▸ Check the flue is correctly fitted and the connections are secure.

4 ▸ Check the condensate pipework is correctly fitted and connected.

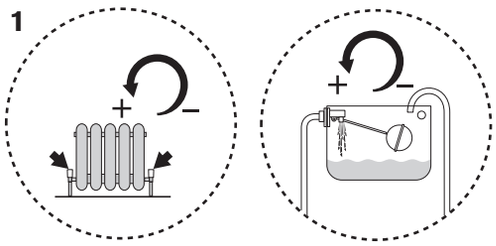
▸ Check the condensate trap is filled with water.

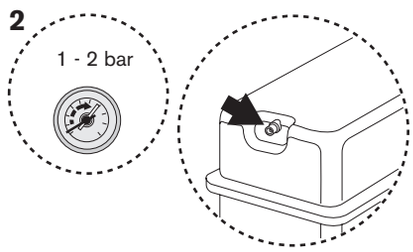
IMPORTANT: If the boiler is not to be commissioned immediately then:

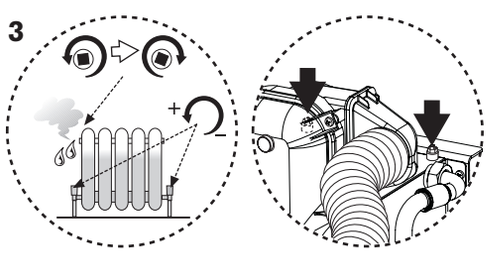
After successfully completing all of the checks and any rectification work, close the water valves, shut off the oil supply and electrically isolate the boiler.

Complete the 'Installation' part of the Guarantee Registration Card.

FILLING THE SYSTEM







1 ▸ Open all system and radiator valves.

▸ Turn on the water main stop cock.

▸ Open vented systems only; turn on the water to the system header tank and allow the system to fill.

2 ▸ Sealed systems only;

▸ Fill the system to between 1 and 2 bar pressure via a WRAS approved filling link.

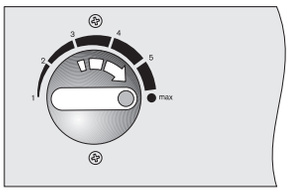
▸ Check the expansion vessel pressure and adjust if necessary using the Schrader type valve.

3 ▸ Vent all radiators, retighten when completed.

▸ Bleed air from the secondary heat exchanger using the manual air vents.

▸ Check the system and rectify any leaks.

IMPORTANT: Never run the appliance when the appliance/system is unpressurised (sealed systems) or empty.

1 

1 ▶ Check the oil supply is correctly fitted and in good working order before turning on the oil supply valves to the boiler.

▶ Turn on the main oil supply valve at the tank and draw off at least 2½ litres of oil until a steady flow of clear uncontaminated oil can be seen as follows:

• Single pipe gravity feed systems:

▶ Disconnect the flexible oil pipe and open the isolating valve to discharge the oil into a suitable container.

▶ When completed, close the isolating valve, reconnect the flexible oil pipe.

• Double pipe sub-gravity feed systems and single pipe suction lift with de-aerator:

Air will be automatically vented when the boiler is started up.

▶ Prime the oil supply pipework to prevent oil pump damage on single pipe systems with a de-aerator using long oil pipe runs.

▶ To prime a de-aerator, disconnect the flexible oil inlet hose (nearest to the de-aerator) and place in a container of the same fuel oil. Place an empty container to collect oil from the oil inlet pipe connection of the de-aerator. Prime the de-aerator and reconnect the flexible oil inlet hose.

▶ Open the isolating valve and the oil pump bleed valve (A) to discharge into a suitable container once the boiler is started up.

▶ Switch on the electricity supply to the boiler.

▶ Set the programmer to ON.

▶ Turn up the boiler Control thermostat.

▶ Allow the burner to run through to 'lock-out' indicated by the illumination of the lockout indicator (E).

▶ Wait 2 minutes then press the lockout reset indicator (E).

▶ Repeat the procedure at least 3 times or until a steady stream of oil, without air, runs from the bleed port, then relock bleed port (A).

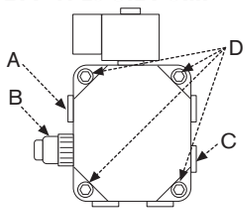
▶ Switch off the boiler.

▶ Remove the oil pump filter, clean with kerosene and refit.

The internal filter is accessed by removing the oil pump cover on the Danfoss BFP 11 L3 and Suntec AS47C.

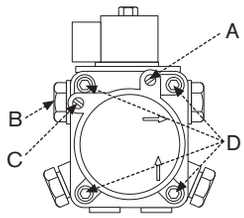
▶ Safely dispose of the container/discharge.

DANFOSS
BFP 11 L3 OIL PUMP

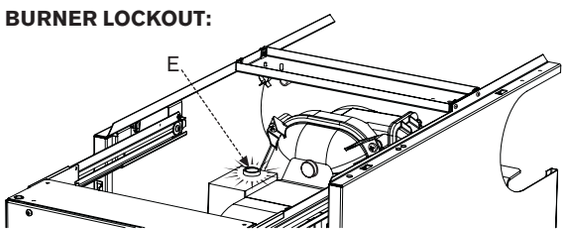


A - Bleed & pressure gauge port
B - Pressure adjustment
C - Vacuum gauge port
D - Retaining screws - cover

SUNTEC
AS47C OIL PUMP



BURNER LOCKOUT:



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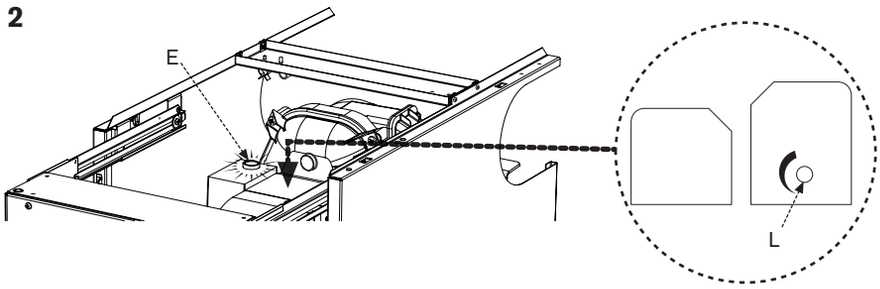

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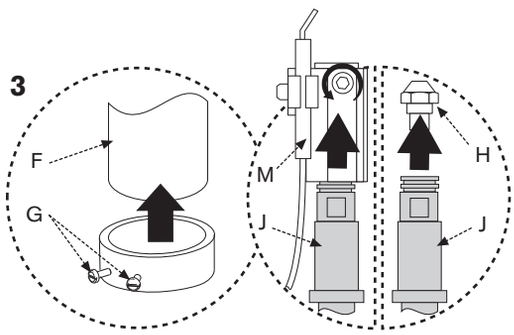

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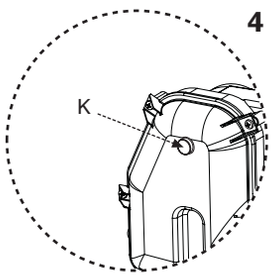
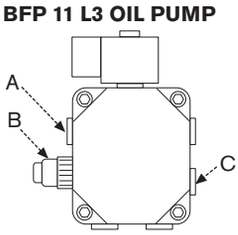
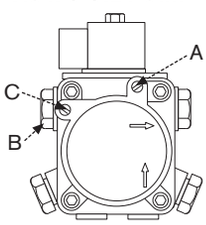


DANFOSS
BFP 11 L3 OIL PUMP

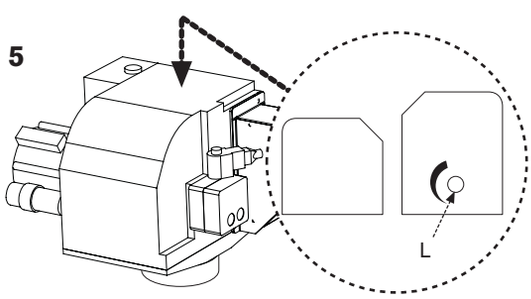


SUNTEC
AS47C OIL PUMP



A - Bleed & pressure gauge port
B - Pressure adjustment
C - Vacuum gauge port

5



NOMINAL BOILER RATING AT NORMAL OPERATING TEMPERATURE USING 28sec KEROSENE:

NOZZLE	OIL PUMP PRESSURE (p.s.i.)	FUEL FLOW RATE		APPROX. FLUE GAS TEMP °C	$\%CO_2$	APPROX. AIR SETTING	APPLIANCE			
							INPUT		OUTPUT	
		Kg/h	l/h				kW	Btu/hr	kW	Btu/hr
Bentone Sterling 50 Burner:										
0.50 80°EH	130	1.56	1.98	72	11.5	4.25	18.6	63300	18.0	61400
0.55 80°EH	145	1.86	2.36	79	12.0	6.00	22.2	75100	21.5	73400
0.65 80°EH	150	2.17	2.75	82	12.5	8.00	25.8	87900	25.0	85300

2 ▶ Fit a suitable pressure gauge to port (A) on the oil pump.

▶ Remove plastic cover from the burner casing.

▶ Adjust the air shutter (L) and pump pressure (B) as shown in the table opposite. The burner should ignite following a pre-ignition period of approx. 15 seconds.

Boiler lockout indicator on:

If the burner fails to establish a normal firing pattern or flame failure occurs the flame monitoring photocell mounted in the burner body will alert the burner control box to shut the burner down and provide a safe lockout state indicated by the illumination of the lockout indicator (E).

▶ Wait 2 minutes then press the lockout indicator/reset button (E) to initiate another start sequence.

▶ Repeat procedure until a flame is established.

3 ▶ Start and run for 3 minutes then switch off.

▶ Check for after-spurting from the nozzle, indicated by oil saturation on the combustion head (F).

If after-spurting occurs:

▶ Release the burner retainers (G).

▶ Remove the burner, combustion head (F) and electrodes (M), hold the burner vertical to unscrew the nozzle (H) and fill the nozzle holder (J) with oil.

▶ Refit nozzle (H), electrodes (M), combustion head (F) and the burner.

▶ Restart and run for 3 minute intervals until after-spurting stops.

4 ▶ Start and run for 20 minutes.

▶ Remove sampling point plug (K) to check the smoke reading is between 0-1. If the smoke level is above 1, check the combustion settings are correct and the oil nozzle is in good condition.

Note; smoke readings may be inaccurate until the smoke from burning organic binder in the access door insulation has ceased.

▶ Check the CO_2 levels and adjust the air shutter (L) setting according to the table opposite.

▶ Check the flue gas temperature is close to the values shown in the table.

If the flue gas temperature is too high and the baffles are correctly fitted, then reduce the oil pump pressure (B) 5-10p.s.i. to compensate for nozzle variations.

▶ Turn off the electrical supply.

▶ Isolate the oil supply to the burner.

▶ Remove the oil pressure gauge.

▶ Refit the blanking plug (A).

▶ Check and rectify any oil leaks.

5 ▶ Switch on the oil supply.

▶ Switch on the electrical supply.

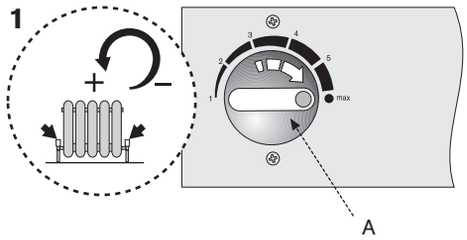
▶ Restart the boiler and run for 5 minutes.

▶ Recheck the CO_2 levels and if required, adjust the air shutter setting (L) according to the table opposite.

▶ Repeat the fine tuning procedure (5) if required.

▶ Refit the sampling point plug (K).

▶ Refit plastic cover to burner casing.



1 ▶ Open all radiator valves.

▶ Set room thermostat to maximum.

▶ Set programmer to ON for CH.

▶ Turn the thermostat control (A) to 'max'.

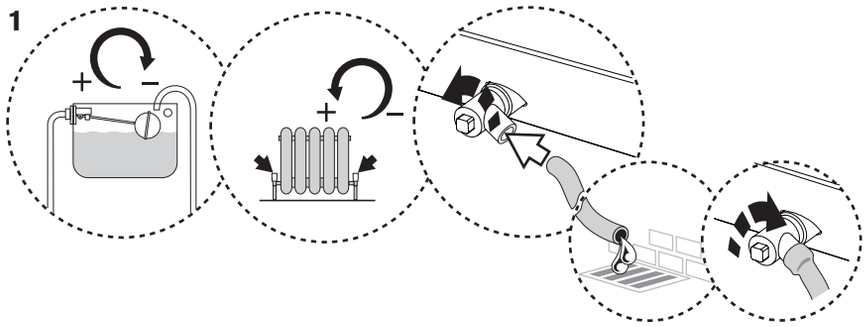
The burner should be ON with the circulating pump.

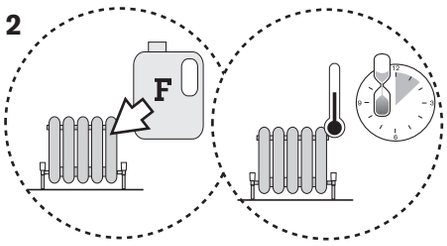
▶ Ensure all radiators are heating up evenly and balance the system to the temperature difference required for the heating flow and return according to the heating load.

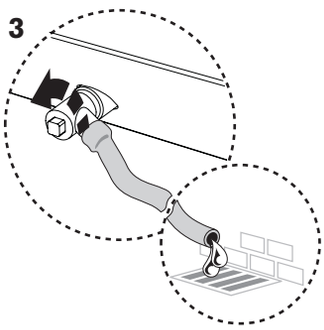
▶ Set the room thermostat to minimum.

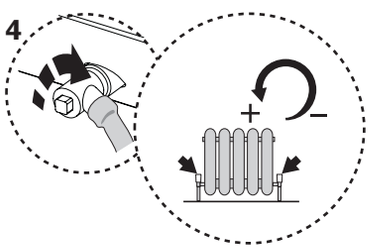
The burner and circulating pump should be off.

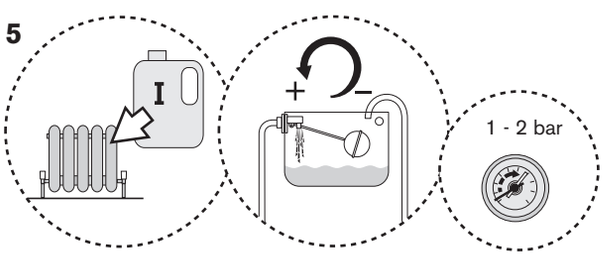
▶ Check all controls/circuits are functioning properly.

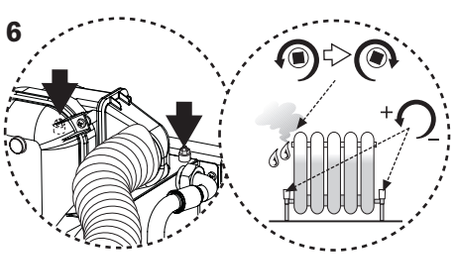












IMPORTANT: Debris from the system can damage the boiler and reduce efficiency. Failure to comply with the guidelines for the use of water treatment with the appliance will invalidate the appliance warranty.

FLUSHING (Central Heating):

1 ▶ Switch off the boiler.

▶ Open vented systems only: turn off the water to the system header tank.

▶ Open all radiator valves/drain cocks and drain the system while the appliance is hot.

▶ Close drain cocks.

2 ▶ Add a suitable flushing agent (F) and refill the system at the correct strength for the system condition in accordance with the manufacturer's instructions.

▶ Run the boiler/system at normal operating temperature for the time stated by the flushing agent manufacturer.

3 ▶ Drain and thoroughly flush the system to remove the flushing agent and debris.

INHIBITOR (Central Heating):

4 ▶ Check drain cocks are closed and all radiator valves are open.

5 ▶ Add a suitable inhibitor (I), (or combined inhibitor/anti-freeze if the system is exposed to freezing conditions) to the heating system in accordance with the manufacturers instructions.

The inhibitor or combined inhibitor/anti-freeze must not cause damage to the materials within the boiler (mild steel, stainless steel, copper and brass) and any other materials/components within the system.

▶ Open vented systems only: turn on the water to the system header tank and allow the system to fill.

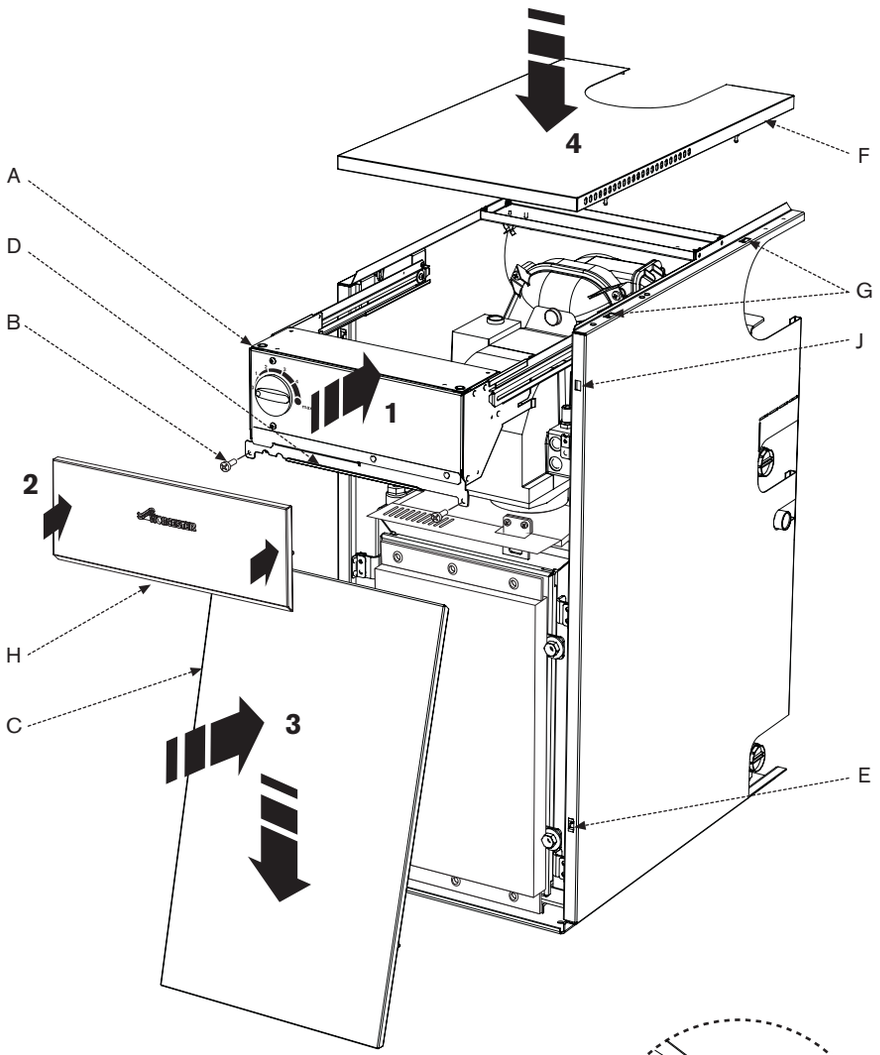
▶ Sealed systems only: fill the system to between 1 and 2 bar via a WRAS approved filling loop.

6 ▶ Vent the boiler and all radiators; retighten vents when complete.

7 ▶ Record the date when the inhibitor was added to the system on the guarantee card.

NOTE: The concentration level of inhibitor in the system should be checked every 12 months or sooner if system content is lost.

The addition of sealing agents to the system water is not recommended as this can cause problems with deposits left in the heat exchanger.

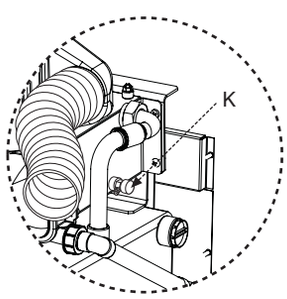


1 ▶ Slide control box (A) into the boiler.
▶ Secure with screws (B).

2 ▶ Align the top front panel (H) and push the ball studs into the connectors (J) to secure.

3 ▶ Locate top edge of panel (C) onto the top supporting ledge (D) on the boiler.
▶ Locate the ball stud connections (E) at the base of the front panel (C) and push towards the boiler to secure.

4 ▶ Locate the top panel (F) onto the ball stud connections (G) and press down to secure.



Handover:

- ▶ Complete the Guarantee Registration Card.
- ▶ Set up the controls and show the user how to operate all the controls shown in the User Guide.
- ▶ Where applicable, instruct the customer how to repressurise the system.
- ▶ If the appliance is unused and exposed to freezing conditions, advise the customer of the precautions necessary to prevent damage to the boiler, system and building.

  In the event of the appliance being inoperative, isolate the boiler and drain the system and boiler.

Note: Release drain point (K) to drain the secondary heat exchanger.

CAUTION: ISOLATE THE WATER, ELECTRICITY AND OIL MAINS SUPPLIES BEFORE STARTING ANY WORK AND OBSERVE ALL RELEVANT SAFETY PRECAUTIONS.

Routine servicing:

To assist efficient boiler operation, the following should be carried out at least once a year.

▶ Carry out a pre-service check and note any operational faults:

Pre-Service Check:

1 ▶ Lift the top panel (A) upwards to disengage the ball stud connections (B) and remove.

2 ▶ Pull base of front panel (E) away from the boiler to disengage ball stud connectors (K).

▶ Lift front panel (E) upwards off the supporting ledge (D).

3 ▶ Pull the top front panel (L) away from the boiler to disengage the ball stud connectors and remove.

Store panels safely away from the working area.

4 ▶ Remove securing screws (C) from each side of the control box (G).

▶ Slide control box (G) outwards to its full extent.

▶ Pivot control box (G) upwards and secure in the service position as shown.

Operate the appliance and system and note any faults which may need to be corrected during the service.

▶ **Switch off and electrically isolate the boiler.**

5 ▶ Depress locking ears and unplug burner lead (F) from control box (G).

6 ▶ Loosen clip (J) to detach air duct pipe.

7 ▶ Unscrew burner retainers (H) to release the burner combustion head (N).

▶ Lift burner away, taking care not to over strain the flexible oil pipe/s or connections.

See the following instructions for detail of some of the service requirements listed below:

▶ Check and clean the burner.

▶ Replace burner nozzle and flexible oil pipe/s.

▶ Check and clean the baffle retainers.

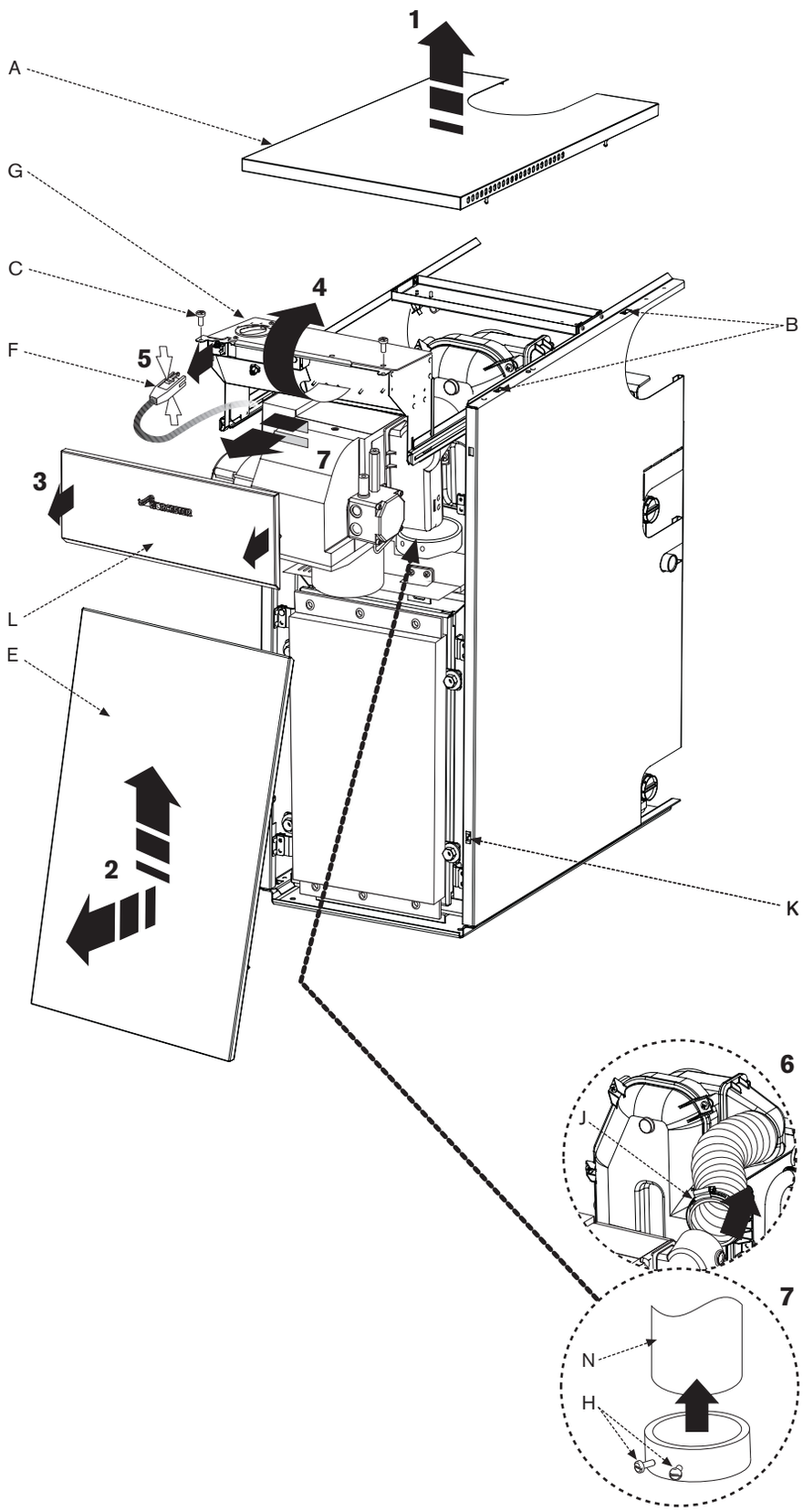
▶ Check and clean the baffles.

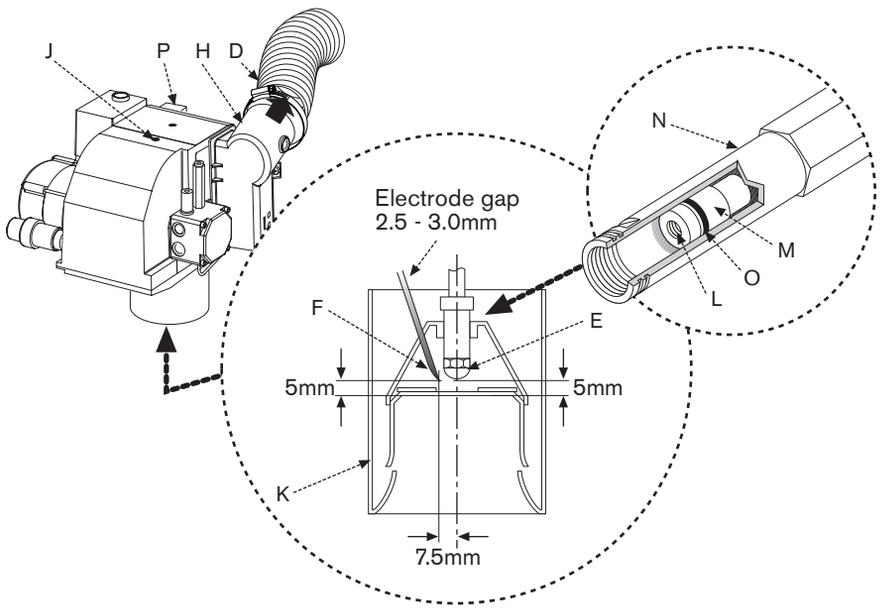
▶ Check and clean the heat exchanger surfaces.

▶ Check the combustion chamber access door insulation board.

▶ Check that the flue system is unobstructed and clean as necessary.

▶ Clean or replace all oil filters.





1 Clean the Burner:

- Remove the air intake cover (H) by removing the M5 screws and clear any debris from the air intake and air damper.
- Separate the main body of the burner from the burner front by removing the M6 screw (J) using a 4mm allen key.
- Check the condition of the gaskets between these parts and replace if necessary.
- Note the position of the air damper adjustment and check the air damper moves freely.
- Clean both sides of the fan impeller and remove any debris from the burner housing.
- Check that the impeller rotates freely.
- Reassemble the components.

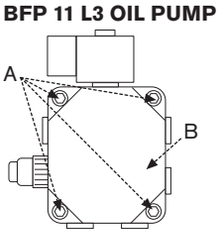
2 Inspection of Mechanical Shut-off Valve:

- Remove the combustion head (K) and thoroughly clean any deposits.
- Remove the nozzle (E).
- Fasten an M5 screw, with a minimum length of 30mm, into the threaded hole (L) and pull the screw to withdraw the check valve (M).
- Check that the nozzle holder (N) is clear of any debris and clean if necessary.
- Check that the three holes in the check valve (M) are clear of any debris. Check the condition of the 'O' ring (O). Discard the check valve if the holes cannot be cleared, if the unit is defective or if the 'O' ring is damaged and replace with a new one.
- Refit the check valve.
- Fit a new oil atomising nozzle (E) - **DO NOT dismantle the nozzle and DO NOT clean the nozzle tip.**
- Check the electrodes (F) and reset if necessary as shown opposite.
- Refit the combustion head. Check that the nozzle (E) lies central to the combustion head and the head settings are as shown.
- Withdraw the photocell (P) from its housing and clean.
- Remove the oil pump internal filter, clean in kerosene and reassemble.

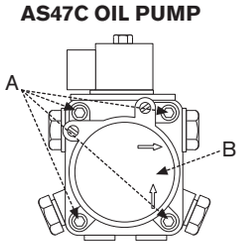
  The internal filter is accessed by removing screws (A) and the oil pump cover (B) on the Danfoss BFP 11 L3 and Suntec AS47C.
- **Replace the standard flexible oil line/s at every annual service to prevent the possibility of leakage due to ageing.**
- Reassemble the burner components.
- Check the sponge O-ring seal located around the combustion head and replace if necessary.

  This seal must be in good condition since failure will cause flue gases to escape into the room.

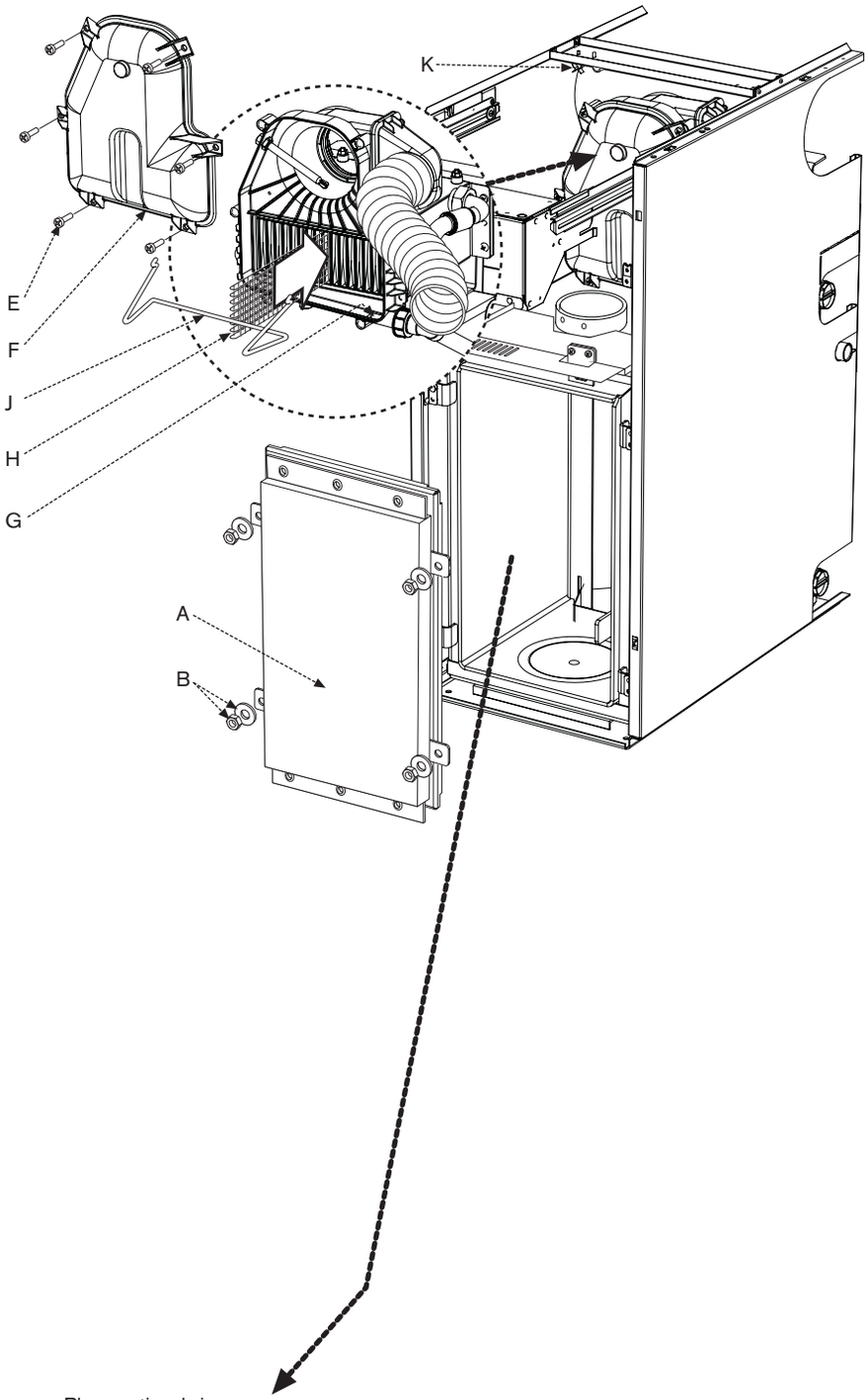
DANFOSS
BFP 11 L3 OIL PUMP



SUNTEC
AS47C OIL PUMP

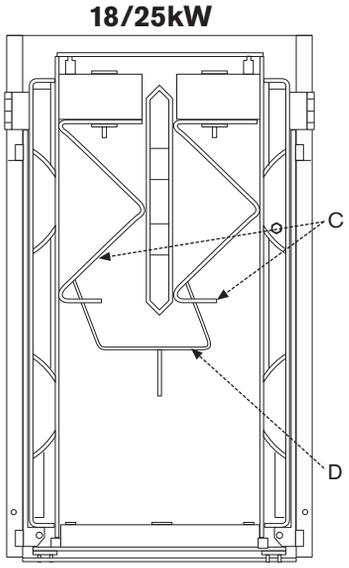


A - Retaining screws - cover
B - Cover - oil pump



Plan sectional view

18/25kW



INSPECTION AND SERVICE

External oil filter:

- Remove the paper element from the external oil filter and replace it. If the filter contains a washable element, thoroughly clean in kerosene and reassemble into the filter.

Clean the boiler:

Manifold access:

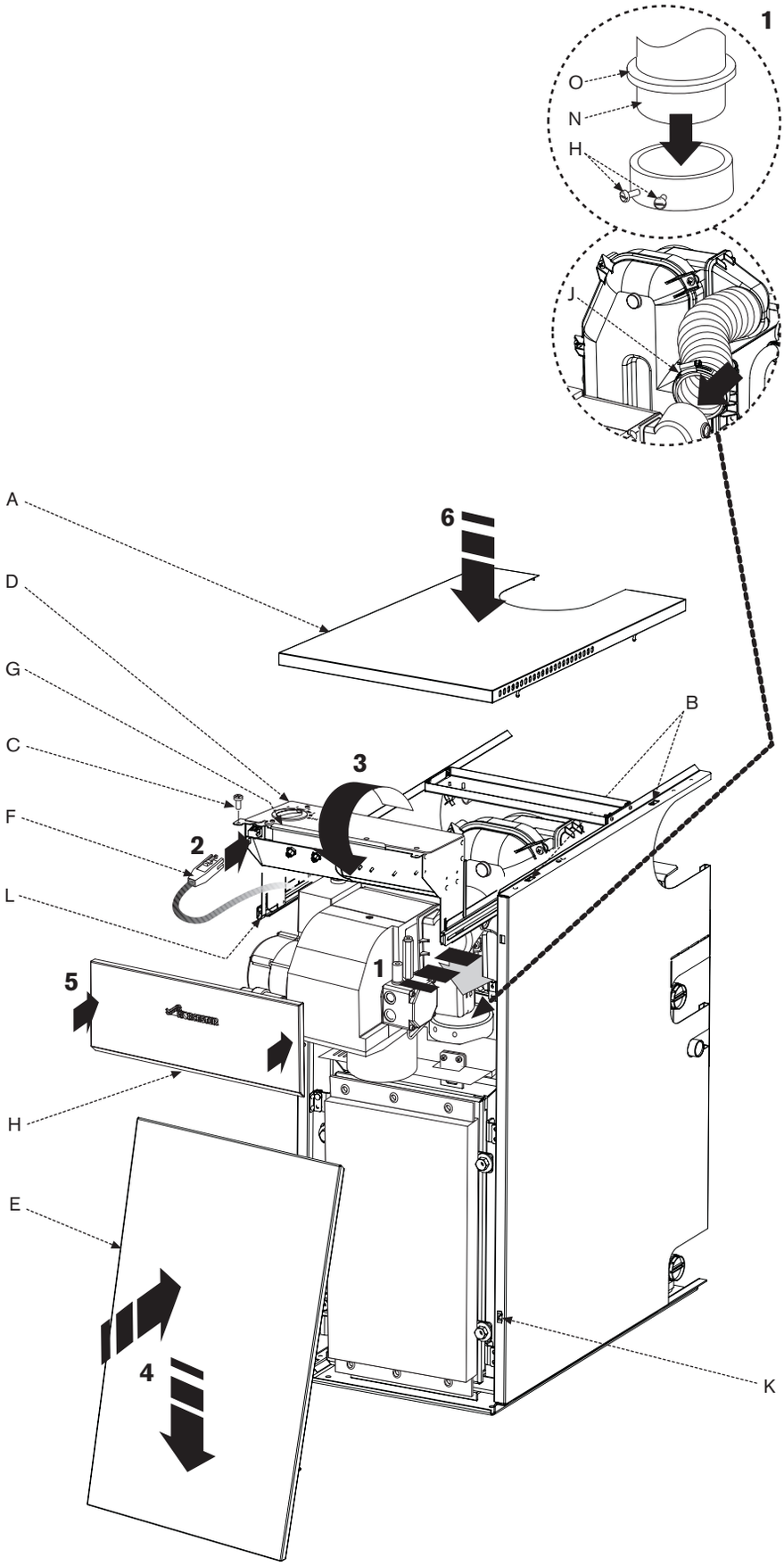
- Release screws (E) to remove the flue manifold access cover (F) and clear any debris.
- Check the condensate route (G) is clear and clean the condensate trap and pipework.
- Check and clean the flue system if necessary.
- Remove the baffle retainer (J) and baffles (H) from the secondary heat exchanger.
- Check and clean the secondary heat exchanger surfaces.
- Clean the secondary heat exchanger baffles (H) if necessary and refit correctly.
- Refill the condensate trap by pouring 500ml of water into the drain (G).
- Refit the baffle retainer (J).
- Check the seal on the manifold access cover (F) and replace if necessary.
- Replace the flue manifold access cover (F) and secure with screws (E).

Combustion chamber:

- Release the M10 retaining nuts and washers (B) and remove combustion chamber access door (A).
- Check the fibreglass rope seal on the combustion chamber access door (A) and replace if necessary.
- Remove and check the baffle retainer (D).
- Remove the baffles (C), clean and check the condition of the baffles and the acoustic insulation. Replace any baffles or insulation pads considered to be badly corroded/degraded.
- Thoroughly clean all of the heat exchanger surfaces using a suitable brush and clear all loose debris from the combustion chamber.
- Check the condition of the combustion chamber access door insulation; if the insulation is damaged the door assembly must be replaced.
- Refit the items in reverse order, ensure the baffles (C) and baffle retainer (D) are correctly fitted as shown in the plan view opposite.
- Refit combustion chamber access door (A).
- Secure with nuts and washers (B) and tighten until the door is firmly secured, do not over tighten the nuts.

Fire valve:

- Check that the oil supply pipe has a fire valve fitted externally to the building with a fire detection element located within the appliance case. A fire valve clip (K) is provided for this purpose.



Re-commission the burner:

1 ▸ Align burner combustion head (N) into the boiler housing tube with the gasket (O) correctly fitted.

▸ Push firmly down to compress the gasket (O).

▸ Tighten burner retainers (H) sufficiently to ensure a good seal.

▸ Refit flexible air hose and secure with clip (J).

IMPORTANT:

Ensure the gasket is a good seal between the burner combustion head and the boiler housing to prevent flue gases escaping from the combustion chamber into the room.

2 ▸ Plug burner lead (F) into control box (G).

Re-commission the burner as described in 'STARTING THE APPLIANCE' under the Commissioning section.

Refit panels:

3 ▸ Unlock support (L) to pivot control box (G) and slide into the boiler.

▸ Secure with screws (C).

4 ▸ Locate top edge of panel (E) onto the top supporting ledge (D) on the boiler.

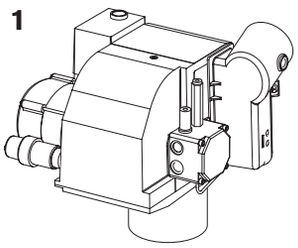
▸ Locate the ball stud connections (K) at the base of the front panel (E) and push towards the boiler to secure.

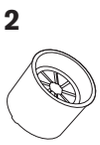
5 ▸ Align the top front panel (H) and push the ball studs into the connectors (J) to secure.

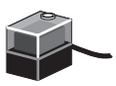
6 ▸ Locate the top panel (A) onto the ball stud connections (B) and press down to secure.

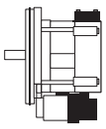
After service handover:

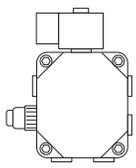
- Make a note of the date of any water treatment.
- Set the controls back to the users requirements.
- If the appliance is unused and exposed to freezing conditions; shut off all the mains supplies, isolate the boiler and drain the system and boiler, including the secondary heat exchanger.

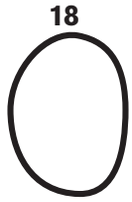












SHORT PARTS LIST

1 Burner - Sterling 50
Part Number: 8-716-108-571-0
2 Combustion head - burner
Part Number: 8-716-108-573-0
3 Control box Satronic DKO 970
Part Number: 8-716-142-396-0
4 Photocell Satronic MZ770s
Part Number: 8-716-156-692-0
5 Control box base Satronic S98 12 pole
Part Number: 8-716-142-782-0
6 Ignition electrode
Part Number: 8-716-156-683-0
7 Motor
Part Number: 8-716-156-645-0
8 Oil pump - Danfoss BFP 11 L3
Part Number: 8-716-142-736-0
9 Transformer (Excludes cable)
Part Number: 8-716-156-696-0
10 Mechanical shut-off valve
Part Number: 8-716-156-658-0
11 Flexible oil line kit
Part Number: 8-716-106-346-0
12 Burner 'O' ring gasket
Part Number: 8-716-106-158-0
13 Control thermostat
Part Number: 8-716-107-621-0
14 Auto reset High Limit thermostat
Part Number: 8-716-107-623-0
15 Manual reset High Limit thermostat
Part Number: 8-716-107-625-0
16 Manual reset flue thermostat
Part Number: 8716-107-624-0
17 Cleaning brush
Part Number: 8-716-109-428-0
18 Manifold access cover seal
Part Number: 8-716-107-536-0
19 Secondary Heat Exchanger gasket
Part Number: 8-716-108-103-0

PROBLEM	CAUSE	REMEDY
LOCKOUT:		
Pulsation on start	CF - Flue draught incorrect	CF - Check flue draught
	Combustion settings incorrect	Set up as in installation instructions
	Faulty nozzle	Replace nozzle
Intermittent lockout	Bad electrical connection	Check control box/electrical connections
	Intermittent flame detection fault	See flame detection fault
	Downdraught	Extend flue or fit an anti- downdraught cowl (CF only)
Burner motor fails to operate	Faulty motor or electrical supply to motor	Check for 230V at motor plug during startup period
	Control box fault	Replace control box
Flame detection fault	Photocell filmed over (dirty)	Clean
	Photocell faulty	Replace
	Control box faulty	Replace
Air adjustment fault	Incorrect CO_2	Set up as in installation instructions
No oil from nozzle	No oil at pump	Check and refill oil tank/bleed oil line
		Check and clean filters & valves from oil tank to boiler
	Air in pump	Bleed pump
	Nozzle blocked	Replace nozzle
	Faulty pump or drive	Replace
	Faulty mechanical shut off valve	Clean or replace
Ignition failure	Electrode settings incorrect	Set up as in installation instructions
	Faulty ignition transformer	Replace
	Open circuit ignition	Check and replace electrodes or high tension leads if necessary
	Faulty control box or electrical connections not properly made	Correct electrical control box connections or replace control box
BURNER FAILS TO START	No power to boiler	Check electrical / control circuit
	Faulty boiler thermostat	Check by temporarily linking out high limit and control thermostats
	Faulty control box	Replace
HIGH SMOKE NUMBER	Air intake/flue blocked	Check & clear air intake/flue
	Incorrect combustion settings	Set up as in installation instructions
	Oil pressure incorrect	Adjust to correct pressure
	Incorrect components used on combustion head	Check with installation instructions
	Faulty nozzle	Replace nozzle

FAULT FINDING

BOILER LOCKOUT:

Indicated by the illumination of the 'Lockout' indicator on the burner control box.

To reset, wait 2 minutes then press the lockout indicator/reset button.

PROBLEM	CAUSE	REMEDY
FAULTY BOILER OPERATION:		
Noisy operation	Pump noise from air in pump or worn pump	Bleed air from pump or replace pump
	Worn motor bearings	Replace motor
	Fan out of balance	Replace fan
Boiling	Faulty boiler thermostat	Replace if necessary
	Short circuit boiler thermostat	Take out of circuit to check
	Thermostat bulb not fully home in pocket	Ensure bulb is pushed fully home
	No primary water circulation	Check system / circulating pump
Short Cycling	Burner rating incorrect	Correct burner rating
	Boiler thermostat differential incorrect	Replace boiler thermostat
	External controls not operating correctly	Check and correct external controls
OIL SMELLS	Blocked flue, fumes on startup	CF - Check flue with gauge and seals/gaskets
		RS - Check seals/gaskets
	Oil soaked boiler, faulty burner operation, numerous lockouts	Rectify burner operation and lockouts
	Odour in boiler room, oil leaks from pipework, flexible hoses connections	Rectify oil leaks, replace components if necessary

INSTRUCTION MANUAL
INSTALLATION COMMISSIONING & SERVICING

www.worcester-bosch.co.uk

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW
Telephone: (01905) 754624 Fax: (01905) 754619

Part Number: 8-716-106-256a (08.05)

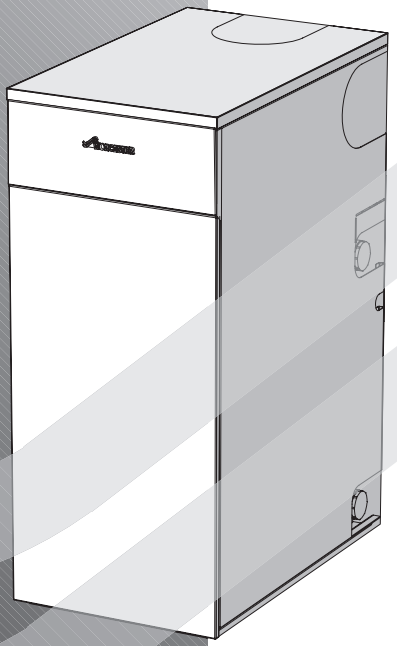
Worcester, Bosch Group is a trading name of BBT Thermotechnology UK Ltd.

WORCESTER
Bosch Group

GREENSTAR UTILITY 18-25kW

FLOOR STANDING OIL-FIRED CONDENSING BOILER CONVENTIONAL FLUE & ROOM SEALED FLUE

FOR FULLY PUMPED OPEN VENT OR SEALED CENTRAL HEATING SYSTEMS AND DOMESTIC HOT WATER CYLINDERS



THE APPLIANCE IS FOR USE WITH 28 SECOND KEROSENE ONLY

GB/IE

WORCESTER
Bosch Group

USER INSTRUCTIONS & CUSTOMER CARE GUIDE

8-716-106-257a (08.05)

CONTACT INFORMATION

WORCESTER BOSCH:

		TEL:	FAX:
Service call centres:			
UK:	08547	256206	757536
SCOTLAND ONLY:	01506	-	441687
EIRE:	01494	0099	
Other enquiries:			
MAIN RECEPTION:	01905	754624	754619
TECHNICAL:	08705	266241	
SPARES:	01905	752571	
LITERATURE:	01905	752556	
SALES:	01905	752640	
WEBSITE:	www.worcester-bosch.co.uk		

WATER TREATMENT:

FERNOX 01799 550811
www.fernox.com

SENTINEL 0151 420 9595
www.betzdearborn.com/sentinel

FLUE TERMINAL GUARDS:

WORCESTER BOSCH

OIL FIRING TECHNICAL ASSOCIATION:

OFTEC 0845 6585080
www.oftec.org

USER INSTRUCTIONS & CUSTOMER CARE GUIDE

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE OPERATING YOUR APPLIANCE.

THESE INSTRUCTIONS ARE APPLICABLE TO THE WORCESTER BOSCH APPLIANCE MODEL(S) STATED ON THE FRONT COVER OF THIS MANUAL ONLY AND MUST NOT BE USED WITH ANY OTHER MAKE OR MODEL OF APPLIANCE.

IF YOU ARE IN **ANY DOUBT** CONTACT THE WORCESTER BOSCH TECHNICAL HELPLINE.

PLEASE KEEP THESE INSTRUCTIONS WITH THE INSTALLATION AND SERVICING INSTRUCTIONS IN A SAFE PLACE OR WITH THE APPLIANCE AFTER INSTALLATION OR SERVICING.

DO NOT INTERFERE WITH ANY SEALED COMPONENTS.

ABBREVIATIONS:

Ø	Diameter
CH	Central Heating
DHW	Domestic Hot Water
TRV	Thermostatic Radiator Valve
IP	Ingress Protection
CF	Conventional flue
RS	Room sealed flue
N/A	Not allowed
PCB	Electronic Printed Circuit Board
SEDBUK	Seasonal Efficiency for Domestic Boilers in the United Kingdom
OFTEC	Oil Firing Technical Association for the Petroleum Industry

CONTENTS

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OIL SMELLS, LEAKS OR FUMES FROM THE APPLIANCE:

- Extinguish any naked flames
- Open windows and doors
- Switch off the appliance electricity supply
- Isolate the fuel supply to the boiler
- Contact boiler engineer

HEALTH & SAFETY:

The appliance contains no asbestos and no substances have been used in the construction process that contravene the COSHH Regulations (Control of Substances Hazardous to Health Regulations 1988). Where applicable, the CE mark indicates compliance with relative EU Directives.

COMBUSTIBLE AND CORROSIVE MATERIALS:

Do **not** store or use any combustible materials (paper, thinners, paints etc.) inside or within the vicinity of the appliance.

The combustion air must be kept clear of chemically aggressive substances which can corrode the appliance and invalidate any warranty.

FITTING & MODIFICATIONS:

Fitting the appliance and any controls to the appliance may only be carried out by a competent engineer in accordance with the relevant Installation Regulations.

Flue systems must not be modified in any way other than as described in the fitting instructions.

Any misuse or unauthorised modifications to the appliance, flue or associated components and systems could invalidate the warranty. The manufacturer accepts no liability arising from any such actions, excluding statutory rights.

SERVICING:

The user must have the system regularly serviced by a competent, qualified OFTEC registered engineer using approved spares, to help maintain the economy, safety and reliability of the appliance.

The appliance should be serviced once each year after installation unless the installation conditions and usage demand more frequent services.

DO NOT OPERATE THE APPLIANCE WHEN:

- The appliance, flue or system is incorrectly fitted, faulty or damaged
- The flue terminal outlet fitted on the outside wall or roof is obstructed or damaged
- There are fumes, fuel leaks or fuel smells from the fuel supply, appliance or flue system
- The system is empty or frozen
- The condensate pipe is blocked or restricted
- The appliance clearances are inadequate
- The air supply is restricted or vents damaged.

EXCELLENCE COMES AS STANDARD

Thank you for purchasing a Greenstar oil-fired condensing boiler from Worcester Bosch. The company prides itself on manufacturing boilers to the strictest quality control standards throughout every stage of production.

Worcester Bosch has led the field in innovative appliance design and performance for more than 40 years. This heritage means all products are of exceptional quality and proven reliability.

The condensing range in particular, is extremely energy efficient, converting more of the fuel consumed into heat offering you economical running costs and value for money. It sits in SEBUK band A, at the top of the energy rated appliances available.

There is also the assurance of our no-nonsense parts and labour guarantee - backed up by 'Worcester Total Cover', an optional complete maintenance scheme to keep your boiler operating at peak condition and efficiency.

To find out more about Worcester Bosch, use the 'Contact Information' shown on the inside front cover.

Read these instructions carefully to get the best from your appliance.

CENTRAL HEATING SYSTEMS:

During the first few hours of operation of the central heating system, check that all radiators are being heated at an even rate.

If the top of a radiator is at a lower temperature than the bottom then it should be vented by releasing air through the venting screw at the top of the radiator. Ask your installer to show you how this is done. Repeated venting will reduce the quantity of water in the system and this must be replenished for safe and satisfactory operation of the appliance.

When excessive venting or water leaks are found in the system you must contact a service engineer to inspect the installation and rectify any fault.

Only use additives compatible with the appliance and system. Use of incompatible additives can cause damage and will invalidate the appliance guarantee.

Sealed heating systems:

Where the appliance is fitted to a sealed heating system your installer will inform you of the minimum and maximum pressure which must be indicated on the pressure gauge.

Regularly check the pressure is maintained and contact your installer or maintenance engineer if there is a noticeable, permanent drop in pressure. If the system loses pressure it should be repressurised and the cause of the fall investigated.

CONDENSATE:

This is a high efficiency appliance using condensing technology which will under normal operation produce a regular discharge of condensate to drain and at times, give out a plume of water vapour from the flue terminal.

ROOM THERMOSTAT:

A room temperature controller must be fitted to control the central heating. Refer to the instructions supplied with the thermostat for information on siting and setting.

THERMOSTATIC RADIATOR VALVES:

It is recommended that this type of valve is fitted to all but one of the radiators (or at least those in the sleeping accommodation). The remaining radiator, which must be where the room thermostat is located, should be un-controlled and must be left open.

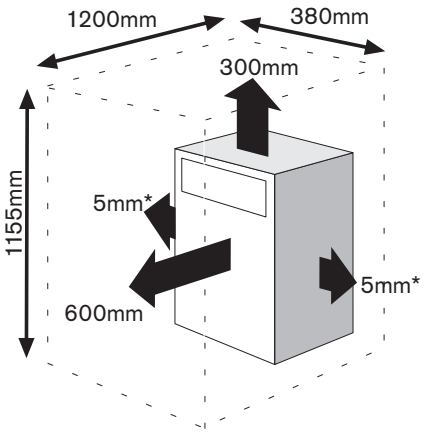
GENERAL INFORMATION

BOILER LOCATION:

This boiler is only suitable for installing internally within a property at a suitable location onto a fixed rigid non-combustible surface at least the same size as the boiler and capable of supporting the boiler weight.

The boiler is not suitable for external installation unless a suitable enclosure is provided.

Roof space installations must fully conform to BS5410 part 1 section 4.6.9



VENTILATION:

Air vents must be functional at all times and the air supply must not be restricted or contaminated.

The appliance clearances must meet the minimum shown opposite for servicing and venting purposes.

** If this clearance is less than 75mm the flue 'knock-out' panel sections must be removed to improve air circulation and cooling.*

Do not place clothes or objects to hinder the air circulation required by the appliance.

Conventional flue appliances require an adequate supply of fresh air which must be delivered to the boiler for combustion purposes through a permanent inlet, such as an air brick, into the area where the boiler is situated.

Conventional flued appliances:

Minimum area of air inlet for combustion:

110cm² for 18/25kW appliances.

GENERAL INFORMATION

If a cupboard or compartment which is to be used for storage or airing is built around the appliance after installation there must be a non-combustible partition around the boiler. Further information can be found in BS 5410 which also describes venting requirements.

Venting compartments:

- Ventilation must be provided for boilers fitted into compartments as described in BS 5410
- A minimum of 2 air vents must be fitted, one at low level and another at high level onto the same wall using the same air for circulation.
- Free air must not be taken from a room or internal space containing a bath or shower and must not communicate with a protected area such as a hall, stairway, landing, corridor, lobby, shaft etc.
- Air vents must allow access for clean free air and must be sited to comply with the flue terminal position requirements.
- Air ducting runs must not exceed 3m.
- Low level air vents must be less than 450mm from the floor.
- A warning label must be added to the vents with a statement to the effect: "Do not block this vent. Do not use for storage'.

MINIMUM AIR VENT AREA (cm²) FOR APPLIANCES INSTALLED IN A COMPARTMENT:

**Internal air to and from a space/room inside the building.*
***External air to and from directly outside the building.*

Conventional flue:

	Internal* ventilation		External** ventilation	
kW	High Level	Low Level	High Level	Low Level
18/25	220	330	110	220

Room Sealed flue:

	Internal* ventilation		External** ventilation	
kW	High Level	Low Level	High Level	Low Level
18/25	220	220	110	110

CONTROLS

A Temperature control *(behind front top panel)*

B Reset button - burner lock-out indicator/reset button *(on burner control box, under top panel)*

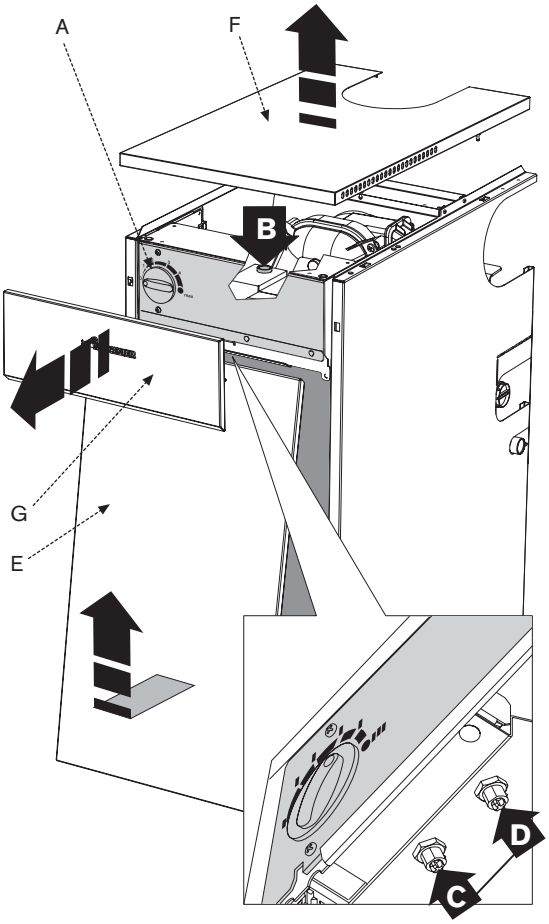
C Reset button - flue overheat thermostat *(behind front panel)*

D Reset button - boiler overheat thermostat *(behind front panel)*

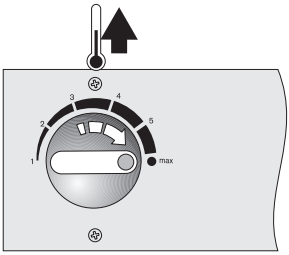
E Front panel

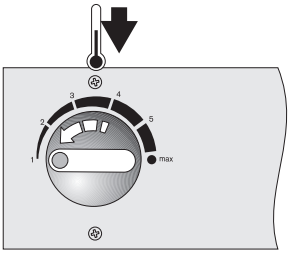
F Top panel

G Front top panel



TEMPERATURE CONTROL:





SWITCHING THE BOILER ON/OFF:

- To switch on the boiler; turn ON the water, oil and electricity supply to the boiler
- Check the programmer/timer is correct and it is set to ON
- Set the room thermostat to the desired setting
- Open and set thermostatic radiator valves as required
- Turn the boiler water temperature control to the required setting
- To switch off the boiler; turn the programmer/timer to OFF for heating and hot water. *If the appliance is left unused and exposed to freezing conditions; shut off all the mains supplies, isolate the boiler and drain the system and boiler.*

SETTING TEMPERATURE:

- Turn the control clockwise to increase the water temperature
- Turn the control anti-clockwise to reduce the water temperature

The burner will run until the water reaches the set temperature on the heating control. Once the water temperature has been reached the burner turns off.

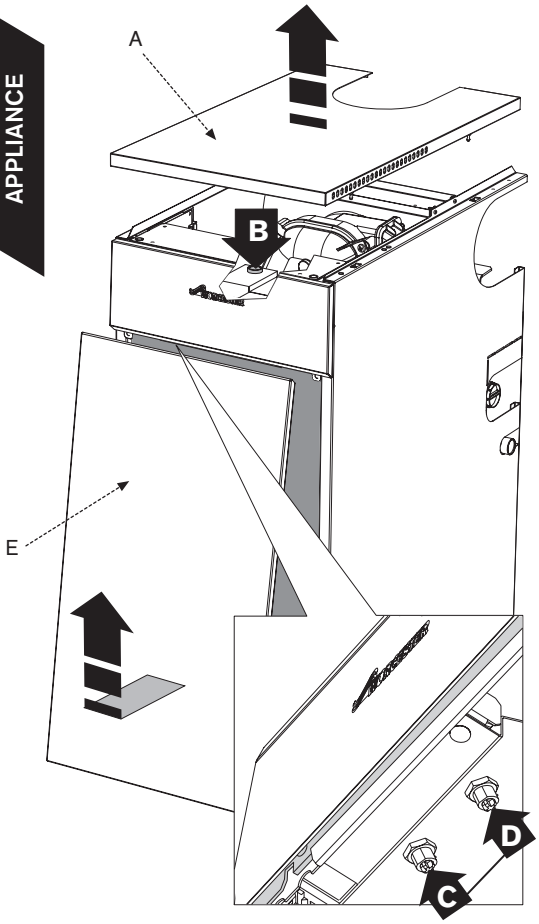
The minimum and maximum ranges of the heating control positions are approx. 55°C to 82°C.

CONTROLLING CENTRAL HEATING:

- Set the programmer/timer to the correct time with the required ON/OFF periods
- Turn the room thermostat to the temperature required
- Set thermostatic radiator valves to the required temperature for each room

FROST PROTECTION:

- Use a suitable anti-freeze/inhibitor at the correct strength to protect against freezing
- A frost thermostat should be fitted to the system where the system is most exposed and at risk of freezing.



FAULT CONDITIONS:

The burner lockout indicator can indicate some basic fault conditions:

Lockout indicator:

a) Lockout indicator ON, boiler not firing;

1 Check the oil level in the oil storage tank

2 Press lockout indicator/reset button (B). Boiler should fire

3 If no response, wait 2 minutes - press lockout indicator/reset button (B) again

4 If lockout light stays on, do not attempt further resets. Contact your service engineer for advice.

b) Lockout indicator OFF, boiler not on, no heating/hot water;

1 Ensure there is a power supply to the boiler

2 Check the programmer is set to on for heating

3 Press the reset buttons (C, D)

4 If the boiler remains off, contact your service engineer for advice.

ACCESSING RESET BUTTONS:

Lockout indicator/reset button (B):

- Pull top panel (A) squarely upwards to remove.
- To refit, align the panel to the boiler and push squarely down until secured, taking care not to damage the panel.

Reset buttons (C,D):

- Pull front panel (E) away at the base of the boiler then lift upwards to remove.
- To refit, position the top edge of the panel onto the boiler ledge then align the base to the boiler and push firmly towards the boiler until secured, taking care not to damage the panel.

TIPS ON ENERGY SAVING

Heating economically:

The boiler is designed to provide a high level of comfort while keeping oil consumption and the resulting environmental effect as low as possible.

The central heating control on the boiler should be set as low as possible while still maintaining a comfortable room temperature.

The temperature of each room can be set individually using the thermostatic radiator valves (except the primary room with the room thermostat).

Roof insulation:

Around 30% of the heat loss from a property is through the roof. Replace any old insulation with new insulation, preferably to a minimum thickness of 200mm.

Window frames:

Single glazed windows, particularly those with steel frames, can lose a great deal of heat.

Consideration should be given to replacement with PVCu or wooden framed double glazed units.

Curtains:

Lined curtains, or heavier full length curtains can provide excellent insulation. However, always ensure that the curtains do not drape over radiators.

Draughts:

Try to ensure that draughts around doors, windows, letterboxes and keyholes etc., are reduced by using a suitable draught excluder.

Warning: do not block or seal any air vents that are installed to ensure the central heating boiler (or other appliance) operate safely.

Room thermostats:

Reducing the setting of the room thermostat by 1°C can reduce fuel consumption by up to 10%.

New control systems:

Upgrade your heating control system with the latest equipment available. The minimum level of control for a heating system is a programmer, interlocking room thermostat and thermostatic radiator valves.

Radiators:

More often than not radiators will be sited underneath a window, so the warm air from the radiator heats the colder incoming air from the window.

The performance of the radiator will be affected if the curtains are allowed to drape over the radiator or shelves are fitted above it.

The positioning of furniture and tables in front of the radiator should also be avoided.

It is advisable to manually adjust all radiator valves every 2-3 months to prevent them from sticking. It is also important that the plastic tops of all valves are always in position and not cracked or damaged to help prevent accidents. Care should be taken when vacuum cleaning carpets to avoid damage to valves and pipework.

The heating system and the outputs of the radiators have been carefully selected by your installer. The temperature obtainable in any given room is dependent on all radiators being operated at the same time. If you decide to turn off radiators in unused rooms, spare bedrooms etc., you may experience slightly lower room temperatures in rooms adjacent to unheated rooms.

MAINTAINING YOUR APPLIANCE

Your new appliance represents a long term investment in a reliable, high quality product.

In order to realise its maximum working life and to ensure it continues to operate at peak efficiency and performance, it is essential that servicing and maintenance checks are performed at least once a year by a competent person beyond the initial guarantee period.

If you would like to know more about a Worcester Bosch service contract, please tick the appropriate box on your warranty registration card.

If your appliance requires servicing please contact a Worcester Bosch contact centre (see inside front cover for details).

PROBLEM	CAUSE	REMEDY
Desired room temperature is not reached	Thermostatic radiator valve(s) set too low	Increase thermostatic radiator valve setting(s)
	Room thermostat set too low	Increase room thermostat setting
	Temperature control on boiler set too low	Increase temperature control setting
	Air trapped in heating system	Bleed radiators and recharge heating system
Desired room temperature exceeded by large amount	Radiators are too hot	Turn down thermostatic radiator valves / room thermostat / boiler temperature control setting
Temperature rises instead of falling	Clock is incorrectly set	Check setting
Hot water temperature too low	Hot water temperature set too low	Check setting of cylinder thermostat then boiler temperature control setting
	Tank cold	Check programmer timings

FAULT OR BREAKDOWN

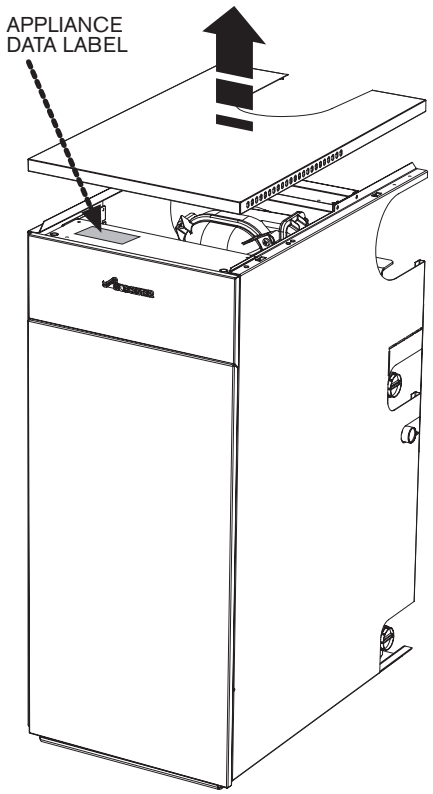
This appliance is supported in the UK by Worcester Bosch, part of BBT Themotechnology UK Ltd.

Specialist factory trained Service Engineers are available to attend a breakdown occurring on this appliance.

No charge will be made for parts and/or labour providing:

- An appliance fault is found and the appliance has been installed within the past 24 months
- Reasonable evidence of this must be supplied on request
- A call-out charge will be made where:
  - The appliance has been installed for over 24 months OR
  - Our Field Service Engineer finds no fault with the appliance (see Note). OR
  - The cause of breakdown is misuse or with other parts of your plumbing/heating system, or with equipment not supplied by BBT Themotechnology UK Ltd.

Note: NO APPLIANCE FAULT IS FOUND ON OVER 30% OF ALL SERVICE CALL OUTS.



Please read this guide carefully to gain a good understanding of the operation of your appliance. In the case of a suspected fault, refer to the fault finding section of this guide.

If in doubt contact Worcester Bosch quoting the boiler serial and model number. These numbers are printed on a Data Label which is located as shown opposite. (You can record this information on the inside back cover of this manual.)

In the event of an appliance fault or breakdown please contact a contact centre (see inside front cover for details). Your service administrator will arrange for an Engineer to call with the minimum of delay. Under normal circumstances this will be from 1 to 3 working days (excluding weekends) for priority breakdown situations (no hot water and/or heating).

Invoices for attendance and repair work carried out on this appliance by any third party will not be accepted.

GUARANTEE

This appliance is guaranteed against faulty materials or workmanship for a period of 24 calendar months from the date of installation subject to the following conditions:

- That during the period of this guarantee any components of the unit which are proved to be faulty or defective in manufacture will be exchanged or repaired free of material charges and free of labour charges if repaired directly by BBT Thermotechnology UK Ltd. Invoices for attendance and repair of this appliance by third parties will not be accepted for payment by BBT Thermotechnology UK Ltd.
- That the householder may be asked to prove the date of installation that the appliance was correctly commissioned and, where appropriate, that the 12 month service inspection has been carried out to the satisfaction of BBT Thermotechnology UK Ltd, when requested. The guarantee card must then be returned within 30 days of installation.
- That any product or part thereof returned for servicing under the guarantee must be accompanied by a claim stating the Model, Serial Number and Date of Installation.
- That BBT Thermotechnology UK Ltd will not accept responsibility for damage caused by faulty installation, neglect, misuse or accidental damage the non-observance of the instructions contained in the Installation and Users Instructions leaflets.
- That the appliance has been used only for normal domestic purposes, for which it was designed.
- That this guarantee applies only to equipment purchased and used in mainland Great Britain.

This guarantee is given in addition to all your normal statutory rights.

Worcester, Bosch Group is a trading name of BBT Thermotechnology UK Ltd.

GUARANTEE REGISTRATION

You should complete and return the postpaid Guarantee Registration Card within 30 days of purchase.

Returning the card will register you as the owner of your new appliance and will assist us in maintaining an effective and efficient customer service by establishing a reference and permanent record for your boiler.

This does not affect your statutory rights.

For your own record:

MODEL:

SERIAL No.

(See identity label inside the appliance casing)

TYPE / SIZE:

DATE OF INSTALLATION:

USER INSTRUCTIONS
& CUSTOMER CARE GUIDE

www.worcester-bosch.co.uk

Worcester, Bosch Group

Cotswold Way, Warndon, Worcester WR4 9SW

Part Number: 8-716-106-257a (08.05)

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